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VOL. XVI.

EDITED BY

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1885 RIDLEY, GEORGE P., L.R.C.S., L.R.C.P., Surgeon King's County Infirmary, Tullamore, King's County.

1885 SHAW, JAMES, L.R.C.S., 93 Talbot-street, Dublin.

† SPEEDY, ALBERT O., L.R.C.P. Ed., Medical Officer No. 3 Dispensary District, North Dublin Union, 28 North Frederick-street, Dublin.

1884 STRAHAN, MICHAEL, L.R.C.S., Medical Officer No. 2 North City Dispensary District, 38 Rutland-square, Dublin.

1895 TURNER, DAVID, L.R.C.P. & S., late Resident Medical Officer Royal Hospital for Incurables, 68 Grosvenor-road, Rathmines.

1896 WAYLAND, R. S., L.R.C.P. & S., 54 South Richmond-street, Dublin.

1895 WINTER, WM. A., M.D., B.Ch. Dub., 5 Upper Leeson-street, Dublin.

1887 WYNNE, GEO. NESBITT, M.D., M.Ch., 31 Harcourt-street, Dublin.

STUDENT ASSOCIATES.

CLUTTERBUCK, LIEUT.-COL., 7 Lower Pembroke-street.

CRAWFORD, JOHN MAGNAW, 113 Donore-terrace, S.C.R.

DONELAN, THOS. O'CONOR, Mater Misericordiæ Hospital.

DREAPER, FRANCES, School of Medicine, Cecilia-street.

ENGLISH, ADELINE, School of Medicine, Cecilia-street.

HARPER, ISABEL WANTYN, 3 Belgrove-villas, Clontarf.

HOUSTON, WM., 15 Grantham-street.

KELLY, WM. D., 6 Raglan-road.

KNOX, E. B., 40 Trinity College, Dublin,

LYNN, KATHLEEN, Medical School, Cecilia-street.

MELDON, GEORGE P., 15 Merrion-square.

O'FARRELL, LEWIS MORE, M.D., Medical School, Cecilia-street.

O'CONNELL, JOHN, School of Medicine, Cecilia-street.

SCARLETT, HON. ELLA, 33 York-street.

SPAIGHT, HENRY, Meath Hospital.

STEWART, PERCY, 8 Ely-place.

SWANZY, H. HUBERT, 26 Cambridge-road, Rathmines.

RULES.

1. The name shall be, "ROYAL ACADEMY OF MEDICINE IN IRELAND." (1887.)

Constitution.

2. The Academy shall consist of Fellows, Honorary Fellows, Members, and Student Associates.

Management.

3. The affairs shall be managed by a Council, consisting of the President, Ex-Presidents (1893), the six Presidents of Sections, the General Secretary and Treasurer, the Secretary for Foreign Correspondence, six Secretaries of Sections, and eight Councillors, being two representatives from the Medical, Surgical, Obstetrical, and Pathological Sectional Councils respectively.

Meetings.

4. The Meetings shall be General and Ordinary.

Publication of "Transactions."

5. The "Transactions" shall be published by the Council, subject to the provisions hereinafter contained.

Original Fellows and Members.

6. All the Members of the present Societies (Medical, Surgical, Obstetrical, and Pathological) shall be Original Fellows or Members, without entrance fee, on payment of the annual subscription on or before 31st December, 1882.[a]

Fellows.

7. Fellows of the Royal College of Physicians of Ireland, and of the Royal College of Surgeons in Ireland, shall be admitted, without ballot, on payment of the entrance fee and the subscription for the current year. All others, being Registered Medical Practitioners not directly or indirectly engaged in the sale of drugs, shall be proposed by two Fellows, and elected by ballot by the Council.

8. Candidates shall be proposed at one Meeting of the Council, and balloted for at the next—one black bean in four to reject.

8A. That all Rules referring to the admission of Fellows, Members, and Student Associates shall be interpreted as referring to Ladies as well as Gentlemen.

Privileges of Fellows.

9. Fellows only shall be eligible for office in the Academy. They shall have the privilege of attending all Meetings of the Academy, of making Communications, and of voting and speaking at such meetings. They shall also receive a copy of the "Transactions."

[a] Those who have paid a Life Subscription to any of the above Societies will be admitted to the privilege of Fellows on payment of Member's subscription.

10. These privileges shall not be exercised by any Fellow in arrear with h subscription.

Honorary Fellows.

11. Honorary Fellows, limited in number to 25, may be nominated by the Council, and elected, on motion at a General Meeting of the Academy by a majority of at least two-thirds of those present and voting.

Members.

12. Any Registered Medical Practitioner may be elected as a Member, the election to be conducted in the same manner as that of Fellows.

Privileges of Members.

13. Members shall have the privilege of attending the Ordinary Meetings of the Academy, of making Communications, and of taking part in debate. They can purchase the "Transactions" at cost price.

Student Associates.

14. Registered Medical Students may be elected Student Associates for the period of one year. The Subscription must be paid before election, and the Council may elect without notice of motion.

15. Student Associates shall have the privilege of attending the Ordinary Meetings of the Academy.

Annual Subscription.

16. Fellows shall pay £2 2s., and Members £1 1s. Student Associates shall pay 5s. The Subscription shall become due on the 1st of October in each year, and if the Subscription be not paid on or before the first Meeting in February, the defaulter shall cease to belong to the Academy, unless the delay shall be accounted for to the satisfaction of the Council. No Fellow shall vote at the Annual General Meeting who has not paid his subscription for the year. Medical Officers of the Army and Navy, and Registered Medical Practitioners not residing within 15 miles of Dublin, are eligible as Fellows of the Academy on payment of the entrance fee, and an annual Subscription of £1 1s.

Entrance Fee.

17. After admission of Original Fellows, all Fellows shall pay an entrance ee of £1 1s.

Council.

18. The Council shall meet on the first Wednesday in the month throughout the Session, or oftener should they see occasion—five to form a quorum.

19. Notice of all Extraordinary Meetings shall be transmitted by the Secretary to every Member of the Council. The President or any five Members of Council may call an Extraordinary Meeting of the Council. The Council shall determine questions by vote, or by division if so demanded, the President having a casting vote only. Any regulation of the Council shall have the force of a law, until submitted to the next General Meeting. The Council shall have the power of filling up any vacancies which may occur in the list of Officers of the Academy, except that of President, before the Annual General Meeting. If a vacancy in the office of President should occur, the General Council shall summon a Special General Meeting of the Academy to fill such vacancy. (1888.)

Sectional Councils.

20. There shall be six Sectional Councils elected by the Annual General Meeting in October, termed respectively—the Medical, the Surgical, the Obstetrical, and the Pathological, the State Medicine, and the Anatomical and Physiological Councils.

21. No Fellow shall be eligible as a candidate for election on more than two Sectional Councils, but no Fellow shall be eligible as a candidate for election on both the Medical and Surgical Sectional Councils. (1888.)

22. Each Sectional Council shall consist of the President of the Section and ten Members, one of whom shall act as Secretary to the Section; except the State Medicine and Anatomical and Physiological Councils, which shall each consist of a President and six Members. (1888).

Meetings of Sectional Councils.

23. Each Sectional Council shall meet on a fixed day at least one week before the Ordinary Meeting of their Section, three to form a quorum.

Powers.

24. Each Sectional Council shall have the power of making any such arrangements as it thinks necessary to carry on the work of the Ordinary Meetings which are under its charge, provided that such arrangements do not interfere with the general laws of the Academy; and any Rules laid down by such Council shall have the force of laws at the Ordinary Meetings under its charge, until submitted to the General Council.

25. Each Sectional Council shall have the power of filling up any vacancies that may occur among its Members until the Annual General Meeting.

Committee of Reference.

26. The Council shall appoint a Committee of Reference, to report upon morbid growths and other specimens exhibited before the Academy; of this Committee the Exhibitor shall, for the occasion, be a Member.

Officers.

27. A President, to be elected by the Annual General Meeting in October, and to hold office for three years.

28. The Presidents of the Colleges of Physicians and Surgeons for the time being shall be the Presidents of the Medical and Surgical Sections. The Presidents of the other Sections shall be elected by the Fellows at the Annual General Meeting, and shall hold office for two years. (1888.)

29. One General Secretary and Treasurer to be elected at the Annual General Meeting.

30. It is expedient that a fixed salary (of one hundred guineas) shall be paid yearly to the General Secretary in consideration of the fact that the editing of the "Transactions" is part of his duties.

31. One Honorary Secretary for Foreign Correspondence to be elected at the Annual General Meeting. (1888.)

32. The Councillors for each Section to be elected at the Annual General Meeting. Each Sectional Council shall elect two Members to act on the

General Council, except in the case of the Sections of State Medicine and Anatomy and Physiology. (1888.)

33. Two Members in each Sectional Council shall retire annually, and be ineligible for re-election for one year, except in the Council of the Section of Anatomy and Physiology, in which only one shall retire (Oct., 1896).

34. Six Secretaries, one for each Section, to be appointed by the Sectional Councils.

35. At all elections after the year 1882, any Fellow desirous of nominating a candidate for election shall, at least one fortnight before the Annual General Meeting, forward an application to the General Secretary to enter the name of such Fellow on the list of candidates for office, provided that the Fellow so nominated shall have consented to act. (1891.)

36. That all elections shall be by ballot, but Fellows residing more than 15 miles from Dublin, and those incapacitated from attending by illness (to be certified), may record their votes by ballot papers, sent to the presiding officer in sealed envelopes provided for that purpose (Oct., 1896).

Duties of Officers.

37. *The President* shall preside at the Annual and Special General Meetings and at General Council Meetings. In the absence of the President, the Chairman shall be appointed by the meeting. (1888.)

38. *The Presidents of Sections* shall preside at the Ordinary Meetings of the Academy, and shall also preside at the Sectional Council Meetings. In the absence of the President, the Chairman shall be appointed by the meeting. (1888).

39. *The General Secretary* shall attend all General Meetings of the Academy and General Council. He shall take minutes of such meetings, to be read at the following meeting.

40. He shall receive and have charge of all papers intended for publication in the "Transactions" of the Academy, after they have been handed over to him by the Secretaries of the several Sections.

41. He shall, on receiving notice from the Secretary of a Section, send out to all the Members notices of the title or titles of the paper or papers for the next Ordinary Meeting, with the name or names of the authors, and, so far as possible, of the subjects for Exhibition, with the names of the Exhibitors.

42. He shall arrange for the Exhibition of specimens and the reading of papers, which are forwarded to the Academy by those who are absent, or are not members.

43. The General Secretary and Treasurer shall receive all moneys, and lodge the same in bank to the account of the Academy, and all cheques shall be signed by the Treasurer and one other Councillor.

44. The Accounts shall be audited by two Fellows, not Members of Council, to be appointed by the President at some meeting previous to the Annual Meeting.

Duties of Secretaries of Sections.

45. To attend the Meetings of the Council of the Section and the Ordinary Meetings of the Academy, under the management of said Council, and to take minutes at such meetings, to be read at the next following meeting of that Section.

46. To keep such papers as the Sectional Councils deem worthy of publication, for the purpose of handing them over to the General Secretary.

47. To inform the Secretary of the Committee of Reference of any specimens referred to that Committee, and to transfer the specimens to that Secretary.

48. To give notice to the General Secretary, one week previously to the meeting, of the titles of papers for the evening, the names of the authors, and, so far as possible, the objects for Exhibition, with the names of Exhibitors, so that the General Secretary may inform the Members.

Meetings.

49. The Annual General Meeting to take place on the last Friday in October, for the election of Officers and Members of Council, and for the general business of the Academy.

50. Due notice of the meeting shall be given by the Secretary to all Members at least three weeks previously. (1891.)

51. No motion involving a change of these Rules shall be brought before this meeting except one week's notice thereof shall have been given by the Secretary to each Member.

52. The President may—and shall forthwith, on receiving a requisition signed by seven Fellows, at any time—on giving one week's notice, summon a Special General Meeting, for the consideration of particular business, the nature of which must be specified in the letter of summons convening the meeting, and at such meeting no other business can be transacted. In the event of the President being unable, from any cause, or declining, to summon a Special General Meeting of the Academy, it shall be in the power of the General Council to summon such meeting. (1888.)

Ordinary Meetings.

53. The communications to be submitted to the Ordinary Meetings shall be grouped under the following heads :—Medicine, Surgery, Pathology, Obstetrics, State Medicine, and Anatomy and Physiology ; and the conduct of such meetings shall be in the hands of the several Sectional Councils, each Sectional Council to have the management of the Ordinary Meeting in rotation, as arranged by the General Council. (1888.)

54. The Ordinary Meetings shall be held on every Friday evening, from the first Friday in November until the last Friday in May, inclusive, at eight o'clock, except during the Christmas and Easter recesses.

55. All Fellows, Members, and Student Associates attending the meetings, shall write their names in the attendance book.

56. Any Fellow or Member may introduce two Visitors by cards obtained from the Sectional Secretaries.

57. Officers of the Army or Navy Medical Departments shall, on presenting their cards, be admitted to the Ordinary Meetings of the Academy.

58. No communication shall exceed twenty minutes in its delivery, nor any speech thereon ten minutes, except by permission of the Chairman. No one shall speak twice upon the same communication, except the author, who has the right of reply.

58 (*a*). A paper by any other than a Fellow or Member of the Academy shall not be read before the Academy unless the author of such a communication shall have obtained permission to do so from the Council of the Section before which the communication is proposed to be read. (1892.)

Ordinary Meetings.—Order of Business.

59. (1.) Chair to be taken at 8 30 p.m.

(2.) Chairman to read list of specimens, &c., exhibited by card, together with the names of the Exhibitors.

(3.) No Pathological Specimen shall be exhibited at any Section other than the Pathological and Obstetrical, except by card. This Exhibition shall not exclude any subsequent communication regarding it at the Pathological Section.

(4.) There shall be no Exhibition of Specimens by card in the Obstetrical or Pathological Sections.

(5.) Any member shall have liberty to exhibit any recent specimen at any of the meetings of the Obstetrical Section, provided it illustrates any question in gynæcology.

(6.) At the meetings of the Obstetrical Section recent specimens may be exhibited, and the President shall invite discussion thereon, provided that such exhibition of specimens or discussion, if any, thereon, must terminate at 9 o'clock, p.m., but that, if necessary, they may be resumed after the papers for the evening have been read and discussed.

(7.) Chairman to ask if any member has any observations to make or motion to propose relative to any living specimen on the List of Exhibition.

(8.) Chairman to call upon the author of the first paper on the list to read his paper.

(9.) Chairman to call upon members to discuss the paper, or, at his discretion, to take any other paper or papers on the list relating to the subject, and have the discussion subsequently on all such papers collectively.

(10.) When the last paper has been discussed, the Chairman to ask if any member desires to speak upon any of the specimens exhibited by card.

(11.) After the discussion upon any specimen, the Exhibitor has the right of reply.

Regulations regarding the Exhibition of Specimens by Card.

60. (1.) Any member may exhibit by card at any Ordinary Meeting, except at the meeting of the Pathological and Obstetrical Sections. At the meetings of the Pathological all specimens must be presented and described *viva voce*, and debate may be invited thereon.

(2.) Notice shall, if possible, be given to the General Secretary, or the Secretary of the Section, on or before the previous Ordinary Meeting.

(3.) Specimens must be in the room at 7 45 on the night of Exhibition.

(4.) Specimens for Exhibition by card shall be open for inspection at 8 p.m.

(5.) A card, containing all particulars for publication, shall be placed with the Specimen. Cards for this purpose are to be obtained from the Secretary.

(6.) The Exhibitor should be present, and he shall furnish further details if asked for.

(7.) Every Exhibitor shall submit the Specimen or Specimens on view to the Committee of Reference, if the meeting so decide.

Exhibition of Pathological Specimens.

61. No lengthened reference to treatment shall be allowed upon any Specimen, except by the express permission of the Chairman. Whenever it has been agreed that a Specimen exhibited at a Sectional Meeting of the Royal Academy of Medicine in Ireland shall be sent to the Reference Committee to report thereon as to its nature, the Exhibitor is to retain the custody of the specimen until he shall be summoned to a meeting of said Committee to be convened by its Secretary, on an early day, when he will attend and submit it for examination. (1889).

By-laws concerning "Transactions."

62. The "Transactions" shall consist of such Communications made to the Academy by or through Fellows or Members as may be deemed by the General Council suitable for publication; also, of discussions of importance or interest arising out of such Communications.

63. All Communications accepted by the Academy become the property of the Academy, but authors may also print their Communications, subsequent to the reading of the same before the Academy, in any publication in addition to the "Transactions." Papers shall be handed to the Secretary of the Section immediately after they have been read. (1891.)

64. The "Transactions" for the year shall be presented to all Fellows of the Academy who have paid their Annual Subscriptions.

65. The "Transactions" may be purchased by Members at cost price.

66. The Publication Committee of each Section shall meet not later than the Tuesday after each meeting of the Section, for the purpose of abstracting the proceedings—the abstract to be placed in the printer's hands on same evening, and forwarded to the editors of medical journals with the least possible delay. (1888.)

67. Contributors of papers are requested to send their papers to the Academy printer early enough to allow of their being put in type before the meeting, and read in proof. (1888.)

68. That on the evening of the day of meeting of the Sectional Council, when the papers for the next meeting have been decided upon, a circular be sent to each contributor informing him :—

(1.) That he is expected to be ready or else take his place at the bottom of the list.

(2.) That he must have an abstract ready with his paper, otherwise he will be noted in the published proceedings in such form as the Publication Committee think fit.

69. The General Council is empowered to defray the expenses in whole or in part of any illustrations which it may consider advantageous to the elucidation of the papers published by the Academy.

70. An abstract (prepared by the author) of each communication made at the Academy, along with a report of the discussions thereon, shall be furnished to the editors of such medical journals as may desire to publish them, and the authors of such communications shall be empowered to publish their papers *in extenso* in any periodical or periodicals they may think fit, such communications also to appear in the "Transactions," provided the Council consider them worthy of insertion.

Expulsion of Fellow or Member.

71. Expulsion of a Fellow or Member can take place only at a General Meeting of the Academy, on the motion of the Council, if two-thirds of the Members present shall vote for the same by ballot. Of such ballot the Council must give at least fourteen days' notice in writing to every Fellow of the Academy.

New Laws.

72. New Laws, or alterations in existing Laws, can be proposed only at the Annual General Meeting. Any Fellow proposing such alteration shall give notice to the General Secretary at least ten days before the General Meeting in October.

REPORT.

THE General Council begs to report that the number of Fellows for the Session 1896–7 was 246; of Members, 36; of Student Associates, 5. The Fellows increased by 10; the Members by 2; and the Student Associates by 1.

On the requisition of a number of Fellows of the Academy, a Special General Meeting was held on April 30th, for the purpose of considering the propriety of voting a sum of money out of the Funds of the Academy to entertain the Anatomical Society of Great Britain and Ireland at a Conversazione.

Professor Cunningham, however, informed the Meeting that as the President of the Academy had invited all the Members of the Anatomical Society to dinner on June 10th, and various entertainments had been arranged for the other days of the Congress, it would not be necessary to ask the Academy to give a Conversazione, and the proposition was accordingly withdrawn.

The Academy was honoured by an Address from Prof. His, of Leipzic, which was delivered on June 11th in the Theatre of the Royal Dublin Society, kindly lent for that purpose. The Address was largely attended, and is published in the volume of Transactions for the past Session.

A Sub-Committee of the Council was appointed in

December last to investigate into the possibility of coming to some arrangement with the *Dublin Journal of Medical Science*, by which that Journal could be constituted the official organ of the Academy. Several meetings were held, but no definite conclusion has yet been arrived at.

At a meeting of the Council held January 6th, it was resolved that the President should be authorised to convey to Lord Lister the sincere congratulations of the Academy on his elevation to the peerage. The President accordingly wrote to Lord Lister, and received from him a letter of thanks, which has been entered on the Council Minutes.

At a meeting of the Council held May 5th, it was resolved to present an Address to Her Majesty the Queen on the occasion of the completion of the 60th year of her reign. The following Address was accordingly drawn up, and forwarded to the Home Office, in Whitehall, for approval:—

ADDRESS.

"MAY IT PLEASE YOUR MAJESTY,

"WE, the President, Council, and Fellows of the Royal Academy of Medicine in Ireland, desire humbly to approach Your Majesty to offer our warm and heartfelt congratulations on the completion of the 60th year of Your Majesty's glorious and memorable reign.

"As members of a scientific body, formed for the study of the laws of health and disease, we gratefully acknowledge the gracious encouragement Your Majesty and the Members of the Royal Family have always given to our profession, and we feel that it must be a source of gratification to Your Majesty to know that the longest reign in the history of the United Kingdom has been

marked by such a general increase in health and well-being, that the average duration of human life in these countries has never been so long as at present.

"We beg respectfully to assure Your Majesty of our loyal attachment to your Throne, Person, and Family, and we pray that Your life and health may long be preserved to enable You to rule over a prosperous and contented people.

Her Majesty was graciously pleased to request H. R. H. the Prince of Wales to receive the Address on Her behalf, and on July 21st the President, the General Secretary, the Secretary for Foreign Correspondence, Sir George F. Duffey, Dr. J. Craig, and Mr. Heuston attended at St. James's Palace, when H. R. H. received the Address, and returned the following reply:—

REPLY.

"On behalf of the Queen, my dear Mother, I thank you for your loyal and dutiful Address, and for the affectionate congratulations which you tender on the completion of the 60th year of Her Reign.

"It is a source of profound joy to the Queen to receive the expressions of devotion to Her Person and Family, which are offered by Her subjects throughout the Empire; She is gladdened by the thought that the 60 years of Her Reign have been years of progress in knowledge, and of increase in prosperity; and She prays that, by the blessing of Almighty God, She may always live in the hearts of Her loving and beloved people."

The following resolution of the Section of State Medicine was forwarded to the Corporation of Dublin on June 2nd by the General Secretary, by order of the General Council:—

"That the Section of State Medicine of the Academy of Medicine is of opinion that the Sanitary Authority of the Dublin District should provide accommodation for convalescents from infectious diseases, with the twofold object of checking the spread of such diseases, and of relieving the congestion of hospitals during epidemics. The Section is further of opinion that provision should be made by above authorities to provide like accommodation for small-pox cases."

The Council deeply regret to record the loss which the Academy has sustained during the past Session by the deaths of Dr. G. P. L'E. Nugent and Mr. F. A. Nixon, two of the original Fellows of the Academy.

General Treasurer's Report for the Session 1896–97.

RECEIPTS.

	£	s.	d.
To Balance in Bank - - - -	24	4	5
„ Subscriptions - - - -	508	8	0
„ Dividends on £596 2s. 4d., at 2¾ per Cent.	3	19	3
„ „ „ „ -	15	17	0
„ „ £155 1s. 10d., at 2½ per Cent.	0	19	5
„ „ „ „ -	3	17	8
Total - - - -	£557	5	9

EXPENDITURE.

			£	s.	d.
By General Secretary - - -			105	0	0
„ Printing, Stationery, and Postage :—					
C. Chambers -	£2	12 6			
Browne and Nolan	1	5 0			
Gerrard Bros. -	0	4 0			
Falconer - -	60	12 1			
			64	13	7
„ Transactions, Vol. XIV. :—					
Fannin & Sons -	148	17 8			
F. Huth - -	19	19 6			
			168	17	2
„ Reporters - - - - -			43	1	0
„ Servants - - - - -			20	10	0
„ Groceries - - - - -			19	13	4
„ Sundries - - - - -			4	8	5
„ Address to Her Majesty the Queen -			3	3	0
„ Royal College of Surgeons - - -			15	15	0
„ Royal College of Physicians - -			15	15	0
„ Balance in Bank - - - -			96	9	3
Total - - - -			£557	5	9

We have examined the Accounts and Vouchers, and certify the same to be correct.

{JAMES CRAIG, M.D., F.R.C.P.
{ROBERT H. WOODS, M.B., F.R.C.S.

October 12*th*, 1897.

Volume XIV. of the "Transactions" has been forwarded to the following:—

Lancet	London.
British Medical Journal	Do.
Medical Press	Dublin.
Hospital Gazette	London.
Dublin Medical Journal	Dublin.
London Medical Recorder	London.
Edinburgh Medical Journal	Edinburgh.
Glasgow Medical Journal	Glasgow.
Liverpool Medical Journal	Liverpool.
Bristol Medical Journal	Bristol.
Asclepiad	London.
International Medical Journal	Do.
Annals of Surgery	Do.
Provincial Medical Journal	Leicester.
Birmingham Medical Review	Birmingham.
Sanitary Record	London.
Practitioner	Do.
College of Surgeons	Dublin.
Do.	London.
Do.	Glasgow.
Trinity College	Dublin.
Royal University	Do.
Queen's College	Belfast.
Do.	Galway
Do.	Cork.
Royal Dublin Society	Dublin.
College of Physicians	Do.
Do.	Edinburgh.
Do.	London.
Faculty of Physicians and Surgeons	Glasgow.
Victoria University	Manchester.
University College	London.
Harveian Society	Do.
Pathological Society	Do.
Clinical Society	Do.
Medical and Chirurgical Society	Do.
Apothecaries' Hall	Do.
King's College	Do.
University	Do.
Do.	Glasgow.
Do.	Edinburgh.
Do.	Durham.
Do.	St. Andrews.
Do.	Aberdeen.
University College	Dundee.
Do.	Melbourne.
Do.	Adelaide.
Do.	Calcutta.
Do.	Bombay.

University College - - - - St. Petersburg
Do. - - - - - Paris.
Do. - - - - - Vienna.
Do. - - - - - Berlin.
Do. - - - - - Brussels.
Do. - - - - - Bologna.
Do. - - - - - Madrid.
Do. - - - - - Amsterdam.
Do. - - - - - Christiania.
Do. - - - - - Stockholm.
Do. - - - - - Toronto.
Do. - - - - - Quebec.
Do. - - - - - New York.
Do. - - - - - Philadelphia.
Do. - - - - - New Zealand.
Do. Library - - - - Tokio, Japan.
Medical Institute - - - - Birmingham.
Dr. Ashby - - - - - Do.
Director-General Billings, Washington, U.S.
Journal de Médecine et de Chirurgie (M. Lucas, Championière), Paris.
Archives de Chirurgie, 108 Boulevard St. Germain, Paris.
Archiv für Klinische Chirurgie, Berlin.
Centralblatt für die medicinischen Wissenschaften, Berlin.
Zeitschrift für Chirurgie, Berlin.
The Australian Medical Gazette, Sydney, N.S.W.
New York Medical Journal, 72 Fifth Avenue.
Journal, American Medical Association, Chicago.
Bulletin de l'Académie Royale de Médecine de Belgique, Brussels.
Medical Journal, Brooklyn.
Naturforschende Gesellschaft, Dr. Rudolf Martin, Seefeldstrasse 119, Zurich.
Academy of Medicine, 17 West 43d Street, New York.
Library, College of Surgeons, Edinburgh.
„ British Medical Journal, 429 Strand, London.
„ Medico Chirurgical Society, Bristol.
Sheffield Medical Journal, 17 Eyre Street, Sheffield.
Archives Cliniques de Bourdeaux, 46 Cours du Jardin-public, Bordeaux
Medical Society of Victoria, Melbourne (Meyer and Metzler, Great Portland, Street, London).
Quarterly Medical Journal, Dr. Coching, 277 Glossop-road, Sheffield.
Medical Library Association, 19th and Stout Street, Denver, Colorado, U.S.
Charlotte Medical Journal, Charlotte, N. C., United States.
Society of Medicine, care of Dr. J. V. Wichman, Copenhagen.
University of Sydney, care of Young J. Pentland, 38 West Smithfield, London, E.C.
Editor, Archivio d'Ortopedia, via S. Calimbro 31, Milan.
Library, Medical Society, Royal University, Upsala.
National Library, Dublin.
Journal of Comparative Neurology, Denison University, Granville, Ohio, U.S.
Dr. Stockwell, Medical Age, Detroit, Michigan, U.S.
Archivio di Ortopedia (Dr. Pietro Panzeri, Instituto dei Rachitici, Milan).
Journal of Comparative Neurology, Dr. C. L. Herrich, Granville, Ohio, U.S.A.

REPORT.

The Report for Session 1895–96 was omitted accidentally in last Volume of "Transactions."

THE General Council begs to report that the number of Fellows for the Session 1895–96 was 236; of Members, 34; of Student Associates, 4. The Fellows increased by 1, the Members by 3, the Student Associates by 2.

A Special General Meeting of the Academy was held, at the request of the Councils of the Sections of Medicine and State Medicine, on the 10th of December, 1895, and the following motion was proposed by Dr. G. F. Duffey:—

"The Royal Academy of Medicine in Ireland having considered the draft scheme prepared by the Superintendent Medical Officer of Health of the City of Dublin, 'for the formation of a Board for establishing Hospitals for infective diseases in the County of Dublin,' is of opinion that it would be inexpedient and is unnecessary to establish in the County Dublin, at a great expense to the ratepayers, a permanent isolation hospital, or hospitals, for cases of infectious diseases arising in the City and County of Dublin. The Academy, however, would view with satisfaction the provision, under the existing powers of the Public Health (Ireland) Act, of adequate isolated temporary accommodation for cases of epidemic small-pox, as well as the establishment of convalescent homes for patients recovering from infectious diseases. Further, the Royal Academy of Medicine desires to point out that the recrudescence of the recent epidemic of small-pox can best be prevented by a continuance of the most unremitting attention to vaccination and to re-vaccination."

But the previous question was moved and carried, and the motion fell to the ground.

On the 12th February the Council passed a Resolution tendering sincere sympathy to Her Majesty and the Princess Beatrice on the death of His Royal Highness Prince Henry of Battenburg, and Her Majesty was pleased to receive the same very graciously.

The Council at its first meeting in October, 1896, received a letter from the General Secretary stating that it was not his intention to offer himself for re-election, owing to his holding the position of President of a Section, and expressing his warmest thanks to the Council and the general body of the Fellows and Members for the kindness with which he had always been treated. The Council thereupon passed the following resolution;—

"That Mr. Thomson's resignation be accepted, and that he be informed that the Council entertain the highest sense of the anner in which he has always performed the onerous duties of Secretary of the Academy."

The Council deeply regrets to record the loss which the Academy has sustained by the death of Dr. George H. Kidd, a former President, and one of the most distinguished members of the Gynæcological branch of the Profession.

JAMES LITTLE, *President.*
WILLIAM THOMSON, *General Secretary.*

General Treasurer's Report for the Session 1895–96.

RECEIPTS.

	£	s.	d.
To Balance in Bank, Oct. 13th, 1895 - -	5	15	2
„ Subscriptions - - - -	463	0	0
„ Fannin, Illustrations - - -	3	13	3
„ Dividend on £596 2s. 4d. 2¾ Consols -	15	17	0
„ „ £155 1s. 10d. 2½ Consols -	3	17	8
Total - - - -	£492	3	1

EXPENDITURE.

	£	s.	d.
General Secretary - - - -	105	0	0
Fannin & Co., Vol. XIII. - - -	157	19	0
Huth, Illustrations - - - -	14	5	6
Falconer, Illustrations - - -	15	2	6
Royal College of Physicians - -	15	15	0
Royal College of Surgeons - - -	15	15	0
Reporting - - - - -	30	9	0
Groceries - - - - -	18	9	5
Servants - - - - -	20	10	0
General Advertiser, Printing - -	8	9	1
Falconer, Printing and Postage - -	53	2	10
Stationery - - - - -	5	13	0
Various Small Amounts - - -	6	4	2
Postage, &c. - - - -	1	8	9
Balance in Bank - - - -	21	4	5
	£492	3	1

We have examined these Accounts and Vouchers, and we certify the same to be correct.

Oct. 14th, 1896.

{G. P. L. NUGENT, M.D.
{ROBERT H. WOODS, F.R.C.S.

TRANSACTIONS

OF THE

ROYAL ACADEMY OF MEDICINE IN IRELAND.

SECTION OF MEDICINE.

PNEUMONIA: A MULTIPLE INFECTION.

By JOHN W. MOORE, M.D., M.Ch., B.A. Univ. Dubl.;
Fellow of the Royal College of Physicians of Ireland;
Senior Physician to the Meath Hospital and County Dublin Infirmary.

[Read in the Section of Medicine, November 19, 1897.]

In a suggestive paper on "Varying Infection in Pneumonia," which was published in *The New York Medical Journal*, October 9, 1897, the author, Dr. W. H. Thompson, M.D., LL.D., of the Bellevue Hospital, writes thus:—"Of late years lobar pneumonia often fails to follow the definite course commonly ascribed to it. While its onset remains much the same in its suddenness, and in the rapid development of its acute symptoms, yet for some time I have declined to fix the probable date of the crisis or the duration of its subsequent stages. It may be that the advent in 1890–91 of the severest and most prolonged visitation of epidemic influenza recorded in history may have something to do with this change by contributing the influence of a mixed infection, but whatever be the cause, there is little doubt that acute lobar pneumonia now often departs more widely from its former characteristic course. In the histories of a series of eleven cases occurring consecutively in my winter service

in Bellevue Hospital, in only three of them could it be said that they conformed to the old-fashioned type, with a definite crisis and a progressive change for the better afterward, while in three a partial crisis only occurred, and in five none at all. In eight out of the eleven the convalescence was very tedious, and marked by a variety of constitutional symptoms in which often the essentially toxic nature of the disease was strikingly indicated. Nothing could better illustrate than they did what a gain it was to modern pathology when lobar pneumonia was finally recognised as more an infection than an inflammation, and that its danger is due rather to systemic poisoning than to pulmonary damage. That infections by micro-organisms, however, should vary in their developments from time to time is what we should expect."

It will be observed from a close reading of the foregoing paragraph that Dr. Thompson inclines to the view that the varying phenomena presented by pneumonia in different cases probably depends upon a varying virulence of its supposed specific micro-organisms, the affection being regarded as an essential disease analogous to diphtheria, enteric fever, small-pox, or any other infective malady.

The micro-organisms in question are two—namely, (1) the Micrococcus of Sputum Septicæmia (Fränkel), *Micrococcus pneumoniæ crouposæ* (Sternberg) or *Diplococcus pneumoniæ* (Weichselbaum); and (2) the *Pneumococcus* (Friedländer) or *Bacillus pneumoniæ* (Flügge). The former is now generally recognised as the usual agent in the production of acute croupous pneumonia, or, as I much prefer to call it, pneumonic fever. It was discovered by Dr. George M. Sternberg, now Surgeon-General of the United States Army, in September, 1880, in the blood of rabbits inoculated subcutaneously with his own saliva. Talamon, in 1883, demonstrated the presence of this micrococcus in pneumonic

sputum, while Sternberg himself, in 1885, identified it with the micrococcus in the rusty sputum of pneumonia by comparative inoculation and culture experiments.[a] In 1886 Weichselbaum published the results of his extended researches relating to the presence of this micrococcus pretty constantly in the fibrinous exudation of croupous pneumonia. He obtained it in 94 out of 129 cases examined (fifty-four times in cultures). To this observer we owe the name *Diplococcus pneumoniæ*, which serves to remind us that, as observed in the blood of inoculated animals, it is usually *in pairs* consisting of oval or lance-oval elements (cocci), which are surrounded by a transparent capsule.

The second pneumonic micro-organism was obtained in 1883 by Friedländer and Frobenius in pure cultures from the exudate into the pulmonary alveoli in cases of croupous pneumonia. Subsequent researches show that this microbe, in shape a short rod with rounded ends—hence called *Bacillus pneumoniæ* by Flügge—is present only in a small proportion of the cases—9 times in 129 cases examined by Weichselbaum, 3 times in 70 examined by Wolf, who pursued his studies in Weichselbaum's laboratory at Vienna.

Emmerich has demonstrated the presence of Friedländer's *Pneumococcus* in the soil of a room in which there were many pneumonia patients. The diagnosis was rendered certain by inhalation experiments with cultivations on 18 mice, of which 8 died of pneumonia. "Hence," says Flügge, "the soil seems to be one of the places where the pneumonia bacilli can be preserved, and whence, in suitable cases, they may pass into human beings." [b]

Flügge also says "Friedländer's bacilli are, without doubt, not the only cause of the pneumonic process. We are already acquainted with pneumonias which are caused by

[a] American Journal of the Medical Sciences, July 1st, 1885.

[b] Micro-organisms. By Dr. C. Flügge. Translated by W. Watson Cheyne, M.B. London: The New Sydenham Society. 1890. Page 259.

aspergillus and actinomyces; it is *à priori* not improbable that also among bacteria there are several other species which can set up pneumonia." Now this is the very point I wish to enlarge upon in the present communication.

The subject may be considered from both an ætiological—or, we might say, a bacteriological—and a clinical standpoint. Naturally, it is chiefly from the latter point of view that I have had opportunities of regarding the question. It is impossible, however, to ignore the bacteriological aspects of the case.

In support of Flügge's statement just quoted, I propose to adduce evidence that the micro-organisms peculiar to erysipelas, to influenza, to tuberculosis, and to enteric fever may one and all give rise to a specific pneumonia or pneumonic fever. So also may Löffler's diphtheria bacillus and the bacillus of malignant anthrax, as well as other pathogenic bacteria.

I. ERYSIPELAS.

In the form of this disease, which has been called "erratic"[a] or "vagrant erysipelas" (*Erysipelas migrans*)—the *erysipèle ambulant* of French writers—the attack may be protracted for one or two months. In such cases, not only every part of the surface of the body, but the whole tract of mucous membranes, and even the lungs and pleuræ, may in turn become affected. Dr. Péter,[b] of Paris, has drawn attention to the spread of erysipelatous inflammation from the pharynx to the respiratory passages, causing in sequence bronchitis, bronchiolitis (capillary bronchitis), and pneumonia.

In a case observed by me at Cork-street Fever Hospital many years ago, the converse of this happened. A man was admitted suffering from *Pneumonia migrans*. After some days a blush of erysipelas showed over one shoulder, and

[a] Wunderlich. *Spec. Path. Therap.* Theil III. Abth. 2, B. Page 351.

[b] Dictionnaire encyclopédique des Sciences Médicales. Tome IV. Page 279. Art. "Angines."

spread thence down the back, with the interesting result that simultaneously the pneumonic symptoms subsided. So great was the impression made upon me by this case that ever since I have recognised the propriety of looking upon *Erysipelas pulmonum* as a distinct species of the great genus Pneumonia.[a]

Grisolle quotes from Serres a case of a patient who had several attacks of pneumonia, each terminating in an attack of erysipelas. Wilson Fox states that he had seen only one such case. The erysipelas appeared three days after complete defervescence, and the resolution of the pneumonia and the subsequent recovery of the patient were greatly protracted.

The teaching of Levy,[b] of Strassburg, that *Streptococcus pyogenes* is an exciter at once of suppuration and of erysipelas is now generally accepted. This pyogenic bacterium was obtained by Fehleisen from the skin involved in cases of erysipelas in 1883, and by Rosenbach and Passet from the pus of acute abscesses within a year or two afterwards. Sternberg gives the following synonyms for *Streptococcus pyogenes*—Micrococcus of erysipelas (Fehleisen), *Streptococcus erysipelatos*; Streptococcus of pus, *Streptococcus longus* (von Lingelsheim).

If, then, we admit the identity of the pus-producing streptococcus with that of erysipelas, we at once obtain a key to the occurrence of an acute pneumonia in erysipelas. For this very bacterium—the *Streptococcus pyogenes*—plays a part that is second to none in the production of influenza-pneumonia, to which I will now direct your attention.

II. INFLUENZA.

In the great epidemic of 1889-90 in Dublin, it was my lot

[a] Cf. Wilson Fox, *Diseases of the Lungs and Pleura*. London, 1891, page 336. Also see Trousseau, *Clinique médicale de l'Hôtel Dieu*, Tome I., page 609; and Reynaud, art. "Erysipèle," *Dict. de la Méd. et Chir. pratiques*, Tome XIV., page 72.

[b] Ueber die Mikro-organismen der Eiterung. (Archiv. für experiment. Path. und Pharm. XXIX. Page 135).

to see fatal cases of influenzal bronchitis, pneumonia, pleuritis, and heart failure. In a paper on the epidemic, read before this Section on Friday, February 28, 1890, I wrote as follows:—"The pneumonia [of influenza], while producing the ordinary physical signs of acute croupous pneumonia, is often latent in its course, or accompanied by a profuse muco-purulent expectoration, with scarcely any rusty sputa. The ebbing of the strength in some of these cases in elderly people is something awful—it is often absolutely beyond control." The fact is that influenza, infrequently directly fatal, causes an indirect loss of life which is appalling, chiefly through the complications affecting the respiratory organs and the heart which have just been mentioned.

It will be remembered that, after the great pandemic of influenza in 1889-90, German medical literature in particular was flooded with writings upon the clinical, pathological and bacteriological aspects of the malady. In the *Dublin Journal of Medical Science* for May, 1890,[a] and August, 1890,[b] will be found Reports on the Bacteriology and Pathological Relations of Influenza, which I prepared from current German medical literature. From these Reports I cull the following facts:—

Leyden, in a communication to the Medical Society of Berlin,[c] states that the pneumonias observed by him showed a peculiar course—severe pain in the side and dyspnœa were rarely noticed; the local process was not altogether typical; frequently it was necessary to watch for 3 or 4 days before any evidence of a localisation of the disease was forthcoming. Then a crepitating râle was heard over a wide area, and this perhaps the very next day would have disappeared to show itself in some other situation. Not very often a firm hepatisation occurred with clearly mapped out dulness. Again the typical sputum of pneumonia was often wanting.

[a] Vol. LXXXIX. No. 221. Third series.
[b] Vol. XC. No. 224. Third series.
[c] Berliner klin. Wochenschrift. 1890. No. 10.

Bacteriological investigations revealed the presence of three kinds of microbes—(1) Diplococci, which represented the well-known pneumonia-diplococci of Fränkel, (2) Streptococci, (3) Staphylococci. Leyden adopted the view that the forms of pneumonia are different—typical genuine pneumonias with deviating course; mixed forms, especially in those combined with pleural effusion; lastly, simple streptococci pneumonias.

Ribbert,[a] discussing the possibility of a causal significance of the *Streptococcus pyogenes* in relation to the phenomena of influenza, alludes especially to the inflammations of the lungs, whose peculiar, erysipelas-like spread, on which Finkler lays so much stress,[b] and whose anatomical relations admit of being referred back to the influence of the streptococcus. Ribbert points out[c] that, in contrast to ordinary croupous pneumonia, the cut surface of the hepatised lower lobe in three cases presented an almost smooth appearance, the exudation was soft, very rich in cells, and poor in fibrin (hypinosis). Cultivation experiments with the tracheal mucus, the lung tissue, the spleen, and the kidneys, furnished in 5 out of 8 cases the *Streptococcus pyogenes*, or else the *Streptococcus erysipelatosus* (which has been shown to be identical with the former), the presence of which microbe could be demonstrated in the sputum also of the influenza patients. His investigations on the whole yield the result that in all cases in which micro-organisms were at all capable of demonstration, the *Streptococcus pyogenes* was found. Only once was there in addition a coccus which had a great resemblance to the *Diplococcus pneumoniæ* and probably represented a modification of the same.

Finkler[d] observed 45 cases of influenzal pneumonia, of

[a] Deutsche med. Wochenschrift. 1890. No. 15.
[b] Deutsche med. Wochenschrift. 1890. No. 5.
[c] Deutsche med. Wochenschrift. 1890. No. 4.
[d] Deutsche med. Wochenschrift. 1890. No. 5.

which only 2 came under the description of typical lobar pneumonia, while the other 43 were regarded as cases of the disease which he has often described as "Streptococcus Pneumonia." Seven of his patients died, *post-mortem* examinations being made in three instances. He regarded the pathological condition as a preponderating cellular inflammation with participation of the interstitial tissue. The cellular nature of the inflammation, together with the pronounced tendency it exhibits to develop by spreading indefinitely, in Finkler's opinion justified him in describing this disease as an erysipelas of the lung. He points out that the resemblance of this form of pneumonia to erysipelas consists, not alone in the anatomical characters of the inflammatory process, but also in the fact that both diseases depend on the presence of streptococci. Finkler looks upon this streptococcus-pneumonia as a localisation of the exciting cause of influenza in the lungs. As to this last point I would be more inclined to agree with Leyden [a] and Levy [b] that the question is much more one of a secondary infection, for which the influenza merely laid the foundation. Certainly the discovery by Pfeiffer, in 1892, of the *Bacillus influenzæ* in the purulent bronchial secretion, and by Canon in the blood of patients suffering from epidemic influenza, must be regarded as conclusive proof of the existence of a specific primary infection to which all other infections are accidental and secondary.

III. TUBERCULOSIS.

It is not my intention here to allude to acute tubercular fever (in which the lungs may escape unscathed) on the one hand, or on the other to the local peri-pneumonic processes which accompany sporadic depositions of tubercle in the lungs in ordinary catarrhal phthisis. Nor will I refer to those

[a] Loc. cit.
[b] Berliner klin. Wochenschrift. 1890. No. 7.

cases in which in the wake of an acute primary croupous pneumonia the wounded lung falls a ready prey to a secondary infection by the *Bacillus tuberculosis*, when this micro-organism finds a fertile soil in the caseating exudation of an unresolved pneumonia. These several conditions are all beside the present question.

My concern is with acute phthisis, or scrofulous pneumonia, and the so-called acute tuberculo-pneumonic phthisis. Dr. C. Theodore Williams thus describes acute phthisis[a]:—"The patient, generally young, who may have had cough previously, is attacked with sharp pain in one side of the chest, quick pulse, high temperature, the skin being quite burning to the ear of the auscultator, alternating with night chills and sweats. The general appearance betokens pneumonia, but the crepitation commences at the apices, extending to the whole lungs, and is not so fine and even as in pneumonia. The cough increases; the expectoration becomes opaque and purulent, containing quantities of lung tissue and swarms of tubercle bacilli; and the temperature assumes the intermittent type. The physical signs show at first gradual consolidation of both lungs, but later on indicate that excavation has taken place; and continues, the patient rapidly wasting and dying in a few weeks." In this disease the inflammatory nature of the lesions in the lung or lungs, and the rarity of miliary tubercle, are among its characteristics.

Acute tuberculo-pneumonic phthisis likewise presents consolidations in the lungs of a pneumonic origin, but tuberculisation, as well as pneumonia, exists.

In both these varieties of "Consumption" we have examples of true pneumonia resulting from an infection by the *Bacillus tuberculosis* of Koch.

[a] Quain's Dictionary of Medicine. Vol. II. Art. "Phthisis." New Edition. 1894.

IV. ENTERIC FEVER.

It is well known that pneumonia is more commonly observed as a complication in enteric fever than in typhus. Murchison noted it in 13 out of 100 cases, and Austin Flint (according to Bartlett[a]) in 12 out of 73 cases. It commonly occurs in the third or fourth week, but may usher in the disease. In this latter case its presence is probably an indication that the enteric fever poison has entered the system through the lungs. It is most commonly a *lobular pneumonia*, but occasionally it occurs under the form of ordinary *croupous pneumonia*.

It is, indeed, true that Eberth[b] points out that anatomical investigations had (up to 1881) afforded no evidence of the admission of the *Bacillus typhosus* through the lungs. With this Gaffky[c] does not agree, for he considers it highly probable—or at least the possibility cannot be contested—that the lungs may occasionally represent the seat of invasion. Eberth himself quotes a case observed by W. Meyer,[d] of Berlin, in which death ensued on the second day of illness. In this case there were found at the autopsy hyperæmia of the lungs, spleen, and kidneys, in the lower portion of the ileum marked swelling of the solitary follicles and Peyer's patches. Microscopical examination revealed a very exceptionally large deposit of Eberth's bacilli in the cells of the submucosa and in the intermediate muscular layers of the intestine. Apparently they were not found in the lungs, notwithstanding their hyperæmic condition.

That, in infective diseases in general, infection may occur through the mucous membranes of the respiratory tract, has

[a] The Fevers of the United States. Fourth Edition. Philadelphia. 1856.
[b] Virchow's Archiv. LXXXIII. 486. 1881.
[c] On the Ætiology of Enteric Fever. Mittheilungen aus dem Gesundheitsamte. B. II. Berlin. 1884.
[d] Untersuchungen über den Bacillus des Abdominal-typhus. Inaugural Dissertation. Berlin. 1881.

been demonstrated (according to Sternberg[a]) by several bacteriologists—especially by Buchner, who caused mice and guinea-pigs to breathe an atmosphere containing in suspension a powder consisting of dried anthrax spores mixed with lycopodium powder, or pulverised charcoal. In a series of 66 experiments, 50 animals died of anthrax, 9 of pneumonia, and 7 survived. Microscopical examination of sections and culture experiments showed that the lungs were extensively invaded. It may be objected that these results do not bear on infection by the *Bacillus typhosus*, which is believed not to assume the spore form. Positive results were, however, also obtained by Buchner with cultures of the anthrax bacillus *not containing spores*, which the animals were made to inhale in the form of spray. But in this case a considerable quantity was required, and a *sero-fibrinous pneumonia* was usually produced, as well as a general infection. "That man may be infected with anthrax by way of the respiratory organs," writes Sternberg,[b] "seems to be well established. In England the disease known as 'wool-sorters' disease' results from infection in this way among workmen engaged in sorting wool, which is liable to contain the spores of the anthrax bacillus when obtained from the skin of an animal which has fallen a victim to this disease. That infection occurs through the lungs is shown by the fact that these organs are first involved, the disease being, in fact, a pulmonic anthrax."

Even if we take it as not yet proved that infection in enteric fever may occur by way of the lungs, there is no doubt that a close correlation exists between this disease and that variety of acute pneumonia, or pneumonic fever, to which the term "Pythogenic Pneumonia" has been commonly applied since 1875, when Dr. Grimshaw and I read a

[a] Sternberg. Loc. cit. Page 230.
[b] Loc. cit. Page 231.

paper on the subject before the Medical Society of the College of Physicians of Ireland.[a]

Towards the end of October, 1882, the following remarkable outbreak of disease came under my notice. On the 12th of that month a lad, aged thirteen, was admitted into Cork-street Fever Hospital from 6 Malpas-street, Dublin, suffering from croupous pneumonia.

Malpas-street is very unhealthy—the houses are old and dirty, ill-drained and dilapidated. The street runs down to the bottom of a valley, through which a small tributary of the Poddle river flows sluggishly. The district is a prolific hotbed of disease. On October 31 the boy's father (John C.), a boatman, thirty-six years of age, came in with the same disease. On the 20th of the same month two girls, both aged fourteen, were admitted to the Meath Hospital in enteric fever—one from 11 Malpas-street and the other from No. 13. On November 27 a girl, aged twenty, was admitted to Cork-street Hospital in enteric fever from 7 Malpas-street, next door to the house from which the two cases of pneumonia had come a few weeks previously. On December 12 John C., aged thirty-six, was again admitted to the Meath Hospital from 6 Malpas-street with "renal dropsy." It was he who suffered from pythogenic (?) pneumonia in the previous October, as narrated above. Another coincidence occurred in March, 1883. On the 18th of that month Winifred N., aged nineteen, came into Cork-street Hospital from 6 Malpas-street in an attack of "febricula," and the following day Anthony L., aged twenty-seven, was admitted from the same house with left basic croupous pneumonia.

A very similar instance of the correlation existing between enteric fever and pneumonia came under my observation in the autumn of 1881. Four cases of illness occurred in a

[a] Dublin Journal of Medical Science. Vol. IX. No. 41. Third Series. May, 1875. Page 399.

training college in Dublin within a few weeks. Two of the four patients suffered from true enteric fever; a third, from an attack of acute gastro-intestinal catarrh, or—as some may think—from an abortive enteric fever; and a fourth from acute pneumonia, reminding one of Laennec's "epidemic pneumonia," which in recent times has received the names of "sewer-gas pneumonia" and "pythogenic pneumonia." The drinking-water was proved by Sir Charles A. Cameron to be the source of the sickness in all four cases.[a]

In November, 1891, there came under my care in the Meath Hospital a young woman with characteristic typhoid stools, and whose urine gave a striking reaction with Ehrlich's diazo test. Her illness, however, had commenced with right apex pneumonia, with rapid breathing, cough, glutinous expectoration (not indeed deeply coloured when the patient was first seen by me), dulness on percussion, and, finally, the most typical *crepitus redux*.

One of the reasons which weighed with me in undertaking to make the present communication to the Royal Academy of Medicine was the remarkable tendency to a pneumonic element in enteric fever which has shown itself in Dublin during the present season. It will be remembered that the end of August and beginning of September proved both wet and cold, while the air-temperature continued below the average through the greater part of September.

These atmospheric conditions were doubtless the prime reason why the epidemic enteric fever assumed the so-called *thoracic* form. I venture to submit brief notes of two cases in illustration of this statement.

Case I.—Robert A., aged forty, a bootmaker, was admitted to the epidemic wing of the Meath Hospital, from New-street, on September 17, 1897, on the eighth day of his illness. His evening

[a] Dublin Journal of Medical Science. Vol. LXXIII. No. 122. Third Series. February, 1882. Page 131.

temperature was 104·3°, pulse 100, respirations 32–36. When I saw him next morning I found him suffering from acute catarrhal laryngitis; the base of the left lung was quite dull, with the other signs of consolidation. He was expectorating a viscid sputum from which the rusty colour was already quickly disappearing. There was active diarrhœa, the daily number of motions varying from three to seven. Forty-eight hours after admission, profuse intestinal hæmorrhage occurred, after which the attack ran the usual course of a typhoid fever, with laryngeal and pulmonary trouble ("laryngo-typhus" and "pneumo-typhus"). Laryngeal examination by Dr. Richard Lane Joynt revealed a severe catarrh. The chart is a characteristic one of enteric fever, but the rapidity of the respirations sufficiently indicates the severity of the pulmonary lesion. In convalescence the patient suffered from boils as a secondary infection.

Case II.—Julia B., aged twenty-two years, a domestic servant, was admitted to the epidemic wing of the Meath Hospital, from Ranelagh, on September 15th, 1897. She was then a week ill. She was sent in as suffering from acute pneumonia, and the physical signs of a left basic lobar pneumonia were present. She breathed from 40 to 44 times a minute, while her pulse at first did not exceed 100, although some days later it rose to 120. The temperature was only 101° on the evening of her admission, but gradually rose until the evening of the twelfth day of her illness, when it reached 104·3°. For several days the patient's condition was extremely unsatisfactory, and in appearance and physical signs the case strongly resembled acute phthisis, or "scrofulous pneumonia." However, she gradually emerged from the fever, the evening spiking of the temperature subsiding after the twenty-fourth day. She left hospital for the Convalescent Home at Bray on October 22nd, the forty-fifth day from the commencement of her attack. At that time the state of her left lung remained far from satisfactory, though it was fast improving. There was still dulness on percussion over the base, the breath and voice sounds were feeble, and some effusion still existed in the pleura.

These cases are types of the form which enteric fever assumed in the unseasonably cold after-summer of the present year (1897.) That the lung attacks were the outcome—direct or indirect—of a specific poisoning by Eberth's bacillus can scarcely be doubted. This poisoning may, it is true, have

been secondary to a localisation in the intestine, although the fact that in each case the lung trouble occurred at the outset of the fever points with much force to a primary localisation in the lungs. However that may be, the presence of an acute pneumonia in each case must be conceded.

Drs. Muir and Ritchie, writing in 1897,[a] say that most observers will agree with Gaffky in attributing any failure to find typhoid bacilli in the organs of a typhoid patient to the difficulties of the search.

These writers further state that in the lungs there may be patches of congestion and of acute broncho-pneumonia. In these, typhoid bacilli may sometimes be observed, but evidence of a toxic action depressing the powers of resistance of the lung tissue is found in the fact that pneumococcus is frequently found in such complications of enteric fever.[b] As to this, I repeat that the very early appearance of pulmonary trouble in a certain proportion of cases which ultimately prove to be undoubtedly enteric fever is altogether in favour of a primary infection with the Bacillus typhosus by way of the lungs. A pneumonia brought about through lessened resistance to the specific micro-organisms of this disease caused by the toxic action of the typhoid bacillus on the system in general, including the organs of respiration, would be much more likely to develop in a more advanced stage of the fever.

In conclusion, I venture to submit that there is clinical evidence to show that a true pneumonitis may occur in any one of the four diseases with which this communication deals—that is to say, erysipelas, influenza, tuberculosis, and enteric fever. Further, it is reasonable to suppose that in each case the pneumonitis is directly due to a localisation of the specific

[a] Manual of Bacteriology. Edinburgh and London: Young J. Pentland. 1897. Page 298.

[b] Loc. cit. Page 312.

poison of the disease in the lung, whether that poison be a micro-organism itself or a toxin derived therefrom. Indeed, in respect of three out of the four diseases named, the evidence, from a bacteriological standpoint, in favour of such a view is incontrovertible.

As regards enteric fever, the influence of season and weather in determining pneumonic trouble is, no doubt, considerable; but it cannot be accepted as paramount or exclusive. And, if it is objected that the *Bacilli typhi abdominalis* of Eberth have not as yet been often found in the lungs or sputum of enteric fever patients, I am justified in attributing this to the comparative infrequency with which, so far, search has been made for these bacteria in the pulmonary organs. Here, in any event, an almost untrodden path of investigation lies open to the adventurous footsteps and the keen perception of our Irish pathologists and students of bacteriology.

Mr. Henry Croly said he had for many years been familiar with pneumonia as a complication of erysipelas, which he ventured to call "*erysipelas of the lung.*" In these cases there were none of the ordinary symptoms of pneumonia present; but on examination of the lungs he found in several cases solidification with the usual dulness, bronchial breathing, bronchophony, &c. He had been acquainted with the disease for twenty-four years.

Dr. J. W. Moore, replying, said that there was one point which he would like to repeat, as he thought he had been misunderstood—he had not said that in very few cases of pneumonia was Friedländer's micro-organism present. That was not what he had intended to convey; but he had intended to convey that in influenzal pneumonia the specific organism of pneumonia was not often present. It was the *Streptococcus pyogenes.*

A CASE OF PITYRIASIS RUBRA.

By JAMES B. COLEMAN, M.D. R.U.I., M.R.C.P.I.;
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Physician to the Children's Hospital, Dublin.

[Read in the Section of Medicine, November 19, 1897.]

In bringing before the Academy a case of the rare skin disease pityriasis rubra, a few remarks on the use of the term may not be out of place. Etymologically the name pityriasis rubra is derived from *πίτυρον* (bran) and ruber (red), and from the time of Bateman it has been applied to various chronic affections of the skin characterised by scales and redness. In 1854 the term was used in a more restricted sense by Devergie, who applied the name *Pityriasis rubra aigue* to the disease, which Hebra, writing in 1860, called pityriasis rubra. Hebra's description is as follows:—"In pityriasis rubra there is nothing more than an intense redness diffused over a large part of the skin, or even universal, disappearing beneath the pressure of the finger (when it gives place to a yellowish coloration), and accompanied by the presence of fine, white, loosely-adherent scales, which result from the constant shedding of the most superficial layer of the cuticle." He insisted on the absence of infiltration, moisture, or of severe itching or excoriations, which were present in psoriasis, eczema, lichen, &c.

Kaposi writes:—"By pityriasis rubra we mean a peculiar disease, first described by Hebra, which is of extremely rare occurrence, and is characterised besides its chronic course by the fact that it presents no other form of eruption (neither nodules, nor vesicles, nor pustules) but that from the start, and during its entire course, there is nothing but redness and desquamation of the skin."

Crocker defines pityriasis rubra as "An inflammatory disease involving the whole surface of the body, characterised by deep redness with abundant flaky desquamation," and he states that it may be primary or follow some other form of dermatitis. He gives "dermatitis exfoliativa" as a synonym. Confusion would be avoided if the name pityriasis rubra were confined to the disease described by Hebra, and if the term "general exfoliative dermatitis" were reserved for cases secondary to other skin diseases—such as psoriasis, eczema, &c. The patient whom I exhibit will be found to be an example of Hebra's type of pityriasis rubra. His *clinical history* is as follows:—

Edward R., aged twenty, a clerk by occupation, was admitted to the Whitworth Hospital, on November 4th, 1897, suffering from general redness and scaling of his skin, with some itchiness. He has had the affection for six months. It appeared suddenly in May, 1897, in the shape of redness on the backs of both his hands and wrists, and, spreading from those regions, the eruption covered the whole body within a week. From the start the skin was bright red, and there was free desquamation of large, thin white flakes. The eruption was preceded by, or attended with, no general symptoms, but there was moderate itching. He had previously enjoyed excellent health, and never had any skin affection. He never had syphilis. He was a total abstainer till November, 1896, since which time he drank to excess, more especially during the month preceding the appearance of the disease. He was constantly exposed to cold, and the night before the onset of the eruption he was out all night and got a severe wetting. Alcohol and chill, therefore, may have had some ætiological influence in exciting the disease.

His family is free from any gouty, rheumatic, or phthisical taint, with the exception of an uncle who died of phthisis. He states that an aunt had eczema.

On admission to hospital he was fairly well nourished, though of rather slight build, and he enjoyed good health except for the condition of his skin. He sometimes complains of feeling chill when he goes out of doors, and he is troubled at night by moderate itching. He eats and sleeps well; his bowels are usually confined; urine normal. His lungs and heart are healthy; temperature normal.

The inguinal and axillary glands are all enlarged, but only to a slight degree.

Examination of the blood shows a normal condition as to sp. gr., hæmoglobin and red corpuscles. He has marked leucocytosis, the white cells being increased to 37,000 per cubic mm. Further, the eosinophile leucocytes are relatively increased, constituting 10 per cent. of all the white cells. A differential count of 1,000 leucocytes gives the following result:—

Lymphocytes	20	per cent.
Large mononuclear and transitional forms...	4	„
Polymorphonuclear neutrophiles ...	66	„
Eosinophiles	10	„

The patient, therefore, has *eosinophilia*, a condition found by Neusser in many skin affections.

The skin all over his body is of a dull red colour, and covered with thin, papery scales. It feels hot, rough, and dry; he never sweats. The redness fades on pressure, leaving a yellowish hue. The scales are thin, whitish, easily separated from the subjacent skin, which is red, but neither moist nor infiltrated. The scales vary in size from a fine branny desquamation on the face and hands, to large flakes as big as a sixpenny piece on the back and on the extensor surfaces of the limbs and dorsal surface of the feet. During the earlier months of the disease the scales were much larger; for the last few weeks they have diminished in size. Every morning about a pint of scales and powdery detritus is found in his bed. The nails of both big toes and of the little finger of his right hand are thickened and nearly separated from their bed by an accumulation of epithelium beneath. The other nails are thin, and longer than the fingers and toes—the thinning being specially conspicuous in the toe-nails. The scalp is covered with whitish-yellow masses of scales, and the hair is falling out. The surface of the palms is a little reddened, and covered with fine, powdery desquamation, and the epidermis appears thin (as if newly formed) and traversed by superficial cracks. The skin of his soles is thicker and desquamating in white flakes. He states that the epidermis peeled freely from his palms and soles at an early stage. When the skin is relaxed, especially at the bends of his elbows, the sides of his neck and trunk, &c., the red and scale-covered surface presents the appearance of crepe, being traversed longitudinally and transversely by fine ridges and furrows; but if the skin is made tense in the same positions, the ridges and furrows are obliterated,

and fine, linear red streaks become apparent. The mucous membranes are not affected, and the tongue is normal.

The above description fairly represents his condition on admission to hospital a fortnight ago; since then he has improved considerably; the amount of the desquamation and the size of the scales have diminished, and the itching is less. The scales are now most evident on the extensor surfaces of his arms, on his back, and on his legs.

The *diagnosis* of the case depends on the presence of universal redness of the skin, associated with loosely-adherent, thin, papery scales, and on *the absence of* thickening, moisture, or of any primary lesion. The case differs from lichen ruber in the absence of papules at any stage, and in the absence of thickening; from pemphigus foliaceus, in the absence of laminated crusts, and of flaccid bullæ, beneath which the corium would be moist and raw; from general eczema, in the absence of exudation and of severe itching, of infiltration, vesicles, pustules, and crusts; from diffuse psoriasis, by the absence of silvery scales adherent into crusts, and the absence of red points when the scales are removed; and from *all* those affections it differs in its absolute universality.

The *prognosis* of the case, both in reference to its probable duration and likelihood of cure, and as regards its danger to life, must be considered serious, but by no means as hopeless as Hebra's and Kaposi's experience would indicate. Those observers record a fatal termination in almost all the cases which came under their notice. On the other hand, Crocker considers 50 per cent. far too high a figure for the mortality, and Pye-Smith refers to forty cases from different sources, with fifteen recoveries and only eight deaths. It is probable that such discrepancy in the proportion of fatal cases in the practice of different dermatologists is due to the fact that general exfoliative dermatitis secondary to psoriasis, eczema

or other skin diseases is not nearly as intractable or as fatal as Hebra's type of pityriasis rubra, whereas some authors classify all cases under the latter category. Most fatal cases appear to occur in children or in elderly patients.

The *rarity* of the disease is indicated by the fact that Hebra met with fifteen cases, and Kaposi only six, whilst Crocker saw only fourteen instances of the affection amongst a total of 10,000 skin cases in his hospital out-patient department.

The *course* is generally very chronic, and the usual cause of death is marasmus or some intercurrent complaint. Cases which apparently recover are very liable to recur.

The *cause* of the disease is unknown.

Regarding the *pathological anatomy* in recent cases there is a moderate amount of cellular infiltration in the cutis and papillary layer. No special changes occur in the epidermis apart from those associated with desquamation. In the later stages there is much atrophy of the skin, the rete Malpighii is thinned, the papillæ disappear, and the skin appendages are obliterated. Where the atrophied skin is tense fissures may occur.

The *treatment* of pityriasis rubra, as may be inferred from the chronic course of the disease and high mortality, is not satisfactory. Such general measures as prolonged rest in bed, avoidance of cold, repeated employment of tepid baths, milk and easily assimilable diet, are indicated, together with the local use of oleaginous applications and emollient ointments. The internal administration of arsenic may be tried in the later stages, though it frequently fails; bark and mineral acids, iron and cod-liver oil have benefited some cases. Perhaps the employment of thyroid extract might be of use. I should add that my patient has been treated with arsenic, ointments and baths for the last few months without any apparent improvement. Since he came under my care a

fortnight ago, I have adopted no more active treatment than keeping him in bed and giving him an aperient mixture containing sulphate of magnesia. Whatever the result may be attributed to, his condition has certainly improved since his admission to hospital, but it remains to be seen if the improvement will be permanent.

[*Addendum.*—The subsequent progress of the case was one of uninterrupted improvement. Patient was kept in bed for a further period of three weeks, during which the saline aperient mixture was continued, and the scales were removed by the daily administration of alkaline baths, combined with the use of Hebra's *Spiritus Saponatus Viridis* as a soap. The tendency to scale-formation lessened every week, the redness of the skin gradually faded, and the hair of the scalp took on new growth. Patient's skin was practically normal towards the end of December, and he left hospital apparently cured early in January, 1898.]

Dr. Wallace Beatty said the diagnosis between the two varieties of pityriasis rubra—that was, the variety which began acutely with red spots and rapidly became general, and the variety preceded by an eczema or lichen—could be made out only by the clinical history. When one saw a universal case of pityriasis rubra which had succeeded an eczema or psoriasis, the appearances of such a case were precisely similar to the appearances in Dr. Coleman's case, so that it just came to be a question whether to call this case pityriasis rubra, when the case is acute and not preceded by any other skin disease, and whether to call the other cases general psoriasis or general lichen. He was inclined to look on pityriasis as a condition which might be primary or which might be secondary to some other skin affection. He described a few cases of skin disease last year, one of which presented all the characters of pityriasis rubra in the beginning; however, the course since shows that it is a case of pemphigus foliaceus. Looking at Dr. Coleman's case for the first time one might think that it was a case of generalised seborrhœa, but the history must show that it was a case of pityriasis rubra.

Dr. Finny said that the case did not conform typically to many of the described symptoms of the disease, and it was hard to say to what group it belonged, except to the class of pityriasis rubra. There were in this case symptoms which he had not seen in any case of pityriasis rubra—namely, great thickening of the scalp, with a great quantity of scales, and with alopecia. These symptoms were absent in the only two cases he had ever seen. Also, the scales in those cases were very much larger than those in Dr. Coleman's case. This fact made one look on the case as one in which scaling was taking place after universal erythema. It struck him that in taking up the skin of the patient's arms and legs it felt extremely tight and hard, and the skin did not seem to him to be the soft skin which is found in pityriasis rubra, but over the tibia it could not be moved at all, and one might think it was eczema with dried exudation. The patient himself said he was itchy and had to scratch himself, and he (Dr. Finny) thought that this was one of the peculiarities wanting in pityriasis rubra, as there was generally no itching at all.

The Secretary (Dr. R. Travers Smith), said that he should like to support Dr. Coleman when he said that the disease was much better marked some time ago when he (Dr. Smith) had seen the patient. The scales were then much more abundant, and the erythema was more intense, especially over the arms and anterior surface of the chest. He asked what Dr. Coleman thought was the significance of the leucocytosis in the case, as he believed it had not been demonstrated in a case of pityriasis before.

Dr. Knott said he had seen a case of pityriasis rubra. The patient was an old man, eighty years of age, and the one symptom that he complained of was sleeplessness, due chiefly to the itching, although not violent itching.

Dr. Coleman, replying, said he agreed with Dr. Beatty that secondary cases of pityriasis rubra or dermatitis exfoliativa were indistinguishable clinically, except for their history, from a case such as he had brought forward, but he thought that a distinction might with advantage be made on account of the relatively better prognosis of the cases which are secondary to eczema, for instance. Regarding Dr. Finny's remarks as to the alopecia of the patient's head, he (Dr. Coleman) thought that some alopecia always existed in pityriasis rubra, and Unna laid stress on this as a symptom of the disease; the accumulation of scales on the patient's scalp was due to the hairs fixing the scales, and to the

fact that the patient's head had not been washed for some weeks. Neither some thickening of the skin nor itching was sufficient to upset the diagnosis of pityriasis rubra; in fact, in some of the very chronic cases a considerable amount of induration of the skin had been found. Itching had also been noticed now and then as a prominent symptom, although it was not usually present. With regard to Dr. Travers Smith's question about the significance of the leucocytosis, he (Dr. Coleman) supposed that in this case it was due to the inflammatory condition of the skin. Neusser had found an increased proportion of eosinophiles in a number of skin diseases, and he (Dr. Coleman) had found such a condition in a case of pemphigus latterly. In reply to Dr. Knott, it was, he thought, true that no other form of skin disease had such an absolutely universal distribution as pityriasis rubra, although one occasionally sees cases of psoriasis diffusa and pemphigus foliaceus affecting almost the whole surface of the body.

A CASE OF SYPHILITIC ENCEPHALOPATHY.

By W. R. DAWSON, M.D.;
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[Read in the Section of Medicine, December 17, 1897.]

THE delimitation of the area occupied by the disease or group of diseases commonly designated General Paralysis of the Insane is a problem which is receiving an increasing amount of attention.[a] Its difficulty lies in the fact that neither clinically nor anatomically is the boundary line between this and a number of other diseases in any way distinct. Especially is this true of the clinical aspect, for, however characteristic a typical case may appear, there can be no question that the percentage of such cases is now relatively small, at least as regards the earlier stages of the disease, and that in the majority of instances the diagnosis presents varying degrees of difficulty in consequence of the more or less atypical nature of the symptoms. On the other hand, there is a well-recognised class of cases, mostly of a toxic character, which may exhibit a group of symptoms almost, if not quite, indistinguishable from those of the graver malady, from which they can sometimes be distinguished only by a prolonged observation of their course. But of these there is one which presents much greater difficulties than any of the others, inasmuch as its ætiology and incidence are identical with those of general paralysis, while the physical and mental phenomena may bear the strongest possible resemblance—I allude to tertiary syphilitic disease of the central nervous

[a] Cf. Discussion opened by Binswanger at the Twelfth International Congress, Moscow.

system. It is mainly as a case in point that I have thought it worth while to bring the following under your notice, although there are not wanting, as I think, other points of interest in it:—

CASE.—A gentleman, forty-five years of age, married, was admitted to Farnham House on February 23rd, 1897. His history, ascertained at various times subsequently, is as follows:—He comes of an aristocratic family, more than one member of which has risen to eminence—his grandfather, for example, held a very high ecclesiastical position—though he himself was merely a minor official in a small provincial town. His mother's sister was insane, and both parents had been addicted to alcohol. The patient is stated to have been very clever and intelligent, with an excellent memory and a taste for reading, and one of the best officials of his class in Ireland. He had, however, always been peculiar, and was boastful, exaggerative, headstrong, and given to extravagance in money matters, believing that he was destined one day to become rich. He never worked hard. There is a tradition that he suffered from sunstroke in boyhood, and he bears the marks of various accidents in the form of scars and the like. He himself admitted having had syphilis many years ago, though his relatives believed him to have lived a most moral life. This was, however, doubtless true since his marriage, about twenty years back, of which there are several living children, the eldest about seventeen. For the past fifteen years he has been a heavy drinker, except at intervals, and his alcoholism culminated a few years ago in an attack of *delirium tremens*, since when it is stated that he "has never been the same man." Fits and paralysis are denied by the relative from whom most of the history was obtained, but the patient stated that he had had some sort of "stroke" about six years ago, followed by right-sided paresis, including right ptosis. (I give this for what it may be worth.) He was, however, undoubtedly under treatment in January, 1891, at the National Eye and Ear Infirmary for ptosis and paralysis of accommodation of the right eye only, at which time he was also suffering from general tremor. The symptoms were ascribed to alcohol and tobacco, in both of which he had been indulging to excess, and after three weeks' treatment with iodide of potassium, combined with abstinence from alcohol and nicotine, his eye was nearly well, and his general state much improved.

There is absolutely no history of severe headache. Diplopia, especially when looking at things obliquely, is said to have been occasionally present before his admission, but he did not remember that it had occurred subsequently. He became insane for the first time in the middle of February—*i.e.*, just prior to his admission.

He was a tall, florid, loosely-built man, with reddish hair and grey eyes, in good bodily condition though not stout, and of a rather weak type of face. His most prominent symptom, which obtruded itself immediately, was a general exaltation of mind, manifested partly in his elated look and expansive manner, and in an excess of good-fellowship, but especially in numerous grandiose delusions. Thus he was always announcing that he had "made his pile," had an estate of 8,000 acres and was going to buy another of the same size, had several sailing yachts and a steam-yacht (the latter, however, being—as he added, *more Hibernico*—worked by electricity), and horses which had won several important races, ridden by himself, and similar instances of his wealth and prowess. He would invite all and sundry to accompany him on yachting-trips or tours on which he was always on the point of starting, and was going to make the fortune of various persons to whom he took a fancy. Withal there was a certain mental weakness perceptible, and he was extremely facile. His memory, however, though certainly impaired in some degree, seemed upon the whole fair, at all events for less recent occurrences, though it was hard to disentangle truth from falsehood in his reminiscences. He answered questions readily. On one occasion only was there a suspicion of a hallucination of hearing.

On the physical side the following were observed during the early part of his residence at Farnham House:—The face was somewhat flattened by partial obliteration of the naso-labial folds, and there was right ptosis. Both pupils were irregular and eccentric, the right being smaller than the left, which was of medium size. Instillation of atropin, at a later date, enlarged both moderately and rendered them equal, but did not abolish the irregularity of outline. Both pupils failed to respond to light, directly or consensually, and to sensory stimulation; both contracted on accommodation, but the left very sluggishly. Accommodation itself was not tested, but there seems to have been difficulty in reading (though this is merely an inference), and that of the right eye was certainly weak, as will be seen subsequently, so that there was probably some paresis.

Dimness of vision was complained of, which the patient afterwards compared to seeing things as if through water, but ophthalmoscopic examination failed to reveal any abnormality, unless perhaps the definition of the optic discs may have been somewhat less sharp than usual. Other motor symptoms were some general tremor, slight tremor of the tongue—not at all marked—and slight jerkiness of gait. Speech anomalies were absent. The knee-jerks were greatly increased, but no distinct ankle-clonus was elicited. "Pins and needles" sensations in the feet were complained of. The heart was easily accelerated and weak (the pulse was 128 at the time of the first examination, the temperature being about 99°), and palpitation was complained of, but otherwise the thoracic organs were fairly healthy. There was some chronic irritation of the pharynx and larynx, but the digestive tract seemed fairly healthy, except that appetite was at first poor. The bowels were stated to be regular. The liver, however, was enlarged, projecting about 1½ or 2 inches below the costal margin, and was rather tender, while some pain was complained of below the right scapula. The urine showed no trace of albumen, and was normal in colour, odour, and reaction. On the skin of the legs and lower part of the back a rupia-like eruption was visible, and there was a slight reddish rash in the centre of the chest. A small scar on the dorsum of the penis was stated by the patient to be the result of a chancre.

At first sight the symptoms and history seemed unmistakably to indicate general paralysis. But although many of the phenomena of this disease were undoubtedly present—in the character of the delusions and general mental attitude, the pupillary anomalies, the exaggerated knee-reflexes, and the flattening of the face, for example—some of the most important, such as, above all, speech abnormalities, as well as pronounced tremor of the tongue, were conspicuous by their absence. Moreover, further observation of the mental state showed that even the delusions were not so utterly childish, or so inconsistent one with another, as is usual in general paralysis; that the patient showed some ingenuity in reconciling them; and that the degree of mental weakness was disproportionately slight

as compared with the delusions—in fact, it was early noted that the patient was fairly reasonable on ordinary matters. As there was also evidence of active syphilis in the skin eruption, it was hoped that the disease might prove to be merely cerebral syphilis; and, accordingly, on March 10th, the administration of iodide of potassium was begun in doses of five grains three times a day, the dose being gradually increased, until at last it reached fifteen grains. No alcohol was given from the time of his admission (in fact, he seemed to have little desire for it), tobacco was limited, and the patient was kept much in the open air.

It may be stated at once that from the time when the iodide of potassium was administered, improvement was steady and uninterrupted. So far from being inconvenienced by the large doses of the salt, the patient declared that he felt much better while taking it, and both appetite and sleep improved, tremor disappeared, ptosis diminished, the gait became firm, and the skin eruption healed. The mental condition, as might have been anticipated, progressed more slowly, but improvement was soon manifest, and the delusions began gradually to pass away. From continually talking about his wealth, his mansion and demesne, and so forth, he came to speak of them less and less, though, if directly questioned, he would still assert their existence. Towards the end of April, not quite seven weeks from the first dose of iodide, it was noted that "a great deal of his talk now is such as might be that of a sane braggart with a total disregard for truth, and who only half expected his stories to be believed. He even said on one occasion, in a joking way, that he "had been telling" one of the other patients "a lot of lies."

It is necessary, however, to deal with the case more in detail, especially as several new symptoms developed in its course.

On March 11th a cramp-like pain was complained of round the abdomen about the level of the transverse colon. On March 25th the gait was stated to be normal, the delusions less in evidence, and spoken of "without any of the usual G.-P. boastfulness and elevation." A few days previously he had complained of having had a "stroke" in the night affecting his right side, but if this was true the only result was a slight lameness next day. Nothing similar occurred subsequently. On the 31st he declared that he had "rheumatic pains" in various parts of his body. A delusion of suspicion was first expressed on April 3rd, but was speedily forgotten. By this time the rupia had healed, and the liver, though still enlarged, had ceased to be tender. The knee-reflexes remained exaggerated. The condition of the pupils was examined on April 20th, and found to be practically unaltered, but sight was stated to be improved. There was some unsteadiness on closing the eyes with the feet together, the only time this symptom was observed. On April 26th the patient stated that, although there was still some dimness of vision, he could now read small print. On May 6th the pupils were unaltered, but the ptosis was slighter. The face was still rather flattened. The patient stated that he saw better, but that the right eye sometimes became fatigued in reading, compelling him to close it and use the left only. The tongue was steady, the knee-jerks less marked, the right being normal. The liver was reduced in size and not tender, the appetite good, and the bowels acting normally. The heart was still slightly jerky, but the pulse-rate only 84. The temperature was not raised. The only complaint was of muscular pains, and of a pain "like a belt" felt at about the level of the costal margin in the morning, and on sitting still for a time. Mentally he was much improved, and especially when excited spoke quite sanely. He occasionally referred to his delusions, especially if questioned, but seemed less sure of them, and was altogether quieter than formerly. He said that he could only remember in a fragmentary way the first five weeks or so of his residence at Farnham House. On the following day, May 7th, he was, owing to want of means, transferred to a district asylum, to one of the medical officers of which I am indebted for the remaining history of the case.

During the next four weeks his state remained unaltered, the exalted delusions persisting. The iodide was continued, though in smaller (5 gr.) doses. In June, however, the exalted delusions seem to have ceased, and he became very angry against all his friends, especially the relative who had been instrumental in sending

him to an asylum. He was constantly demanding his release and writing letters, many of them in a childish manner, and threatening actions at law against anyone who had anything to do with his committal or detention. At the same time he was dull and depressed. There was little alteration during July, but in August, after a visit from his brother, he somewhat suddenly changed for the better, became bright and cheerful, and seemed reconciled to his friends, saying that he was sure they had all acted for the best. This improvement continued, and he was finally discharged recovered on September 9th. The ptosis had further improved at this time, and the irregularity of the pupils had disappeared about a month prior to his discharge. The last account received of his state has been favourable.

We have here a brain hereditarily weak, and further impaired by the syphilitic virus, by alcohol, and by an attack of *delirium tremens*. Certain ocular symptoms occur, which recover with abstinence and iodide, but some years subsequently, with a syphilitic skin-eruption, there is a return of the ocular symptoms in increased extent, with exaggerated knee-reflexes, various sensory anomalies (muscular and, possibly, girdle-pains, "pins and needles" sensations in the feet), some appearance of muscular weakness (flattening of the face, tremors), cardiac weakness, and enlargement of the liver. With these there is a mental alienation characterised by grandiose delusions, elevation, and some mental weakness. Abstinence and iodide once more prove effective; and, after being an inmate of an asylum for some seven months, the patient has quite recovered mentally, and is, physically at all events, enormously improved.

The result of antisyphilitic treatment, both as regards the tolerance of iodide and the ultimate issue of the case, having thus confirmed the diagnosis, which was at first indeed merely a suggestion,* there can be little doubt as to

* As a matter of fact, the case was at first regarded as probably one of general paralysis.

the syphilitic nature of the case. Nevertheless, there were two important facts against this view—namely, the existence of grandiose delusions, which are usually said to be rare in insanity due to cerebral syphilis, and the total absence of the severe headaches and insomnia which almost invariably accompany the latter. No argument either way could be drawn from the pupillary phenomena, which would be equally likely to occur in tertiary syphilis or general paralysis; but the ptosis and diplopia would rather indicate the former. Most of the other symptoms might have been caused by general paralysis, by syphilis, or, as I have no doubt some of them were, by chronic alcoholism. But, on the whole, the evidence was in favour of tertiary syphilis, and the issue of the treatment has settled the question. It therefore only remains to discuss the symptoms and endeavour to draw some conclusion as to the nature and position of the syphilitic lesions.

In the first place, it may be said at once that the total absence of the symptoms of tumour, more especially of headache and optic neuritis, negatives the idea of any bulky or extensive gummatous formation; and, in fact, the former argues against extensive disease of any sort. Now, the cases of cerebral syphilis in which the symptoms resemble those of general paralysis seem to be, as a rule, of two classes—those, namely, in which there is extensive disease of the convexity of the brain, and those in which the vessels are chiefly involved. The former may here be excluded, both for the reasons given above and from the absence of such persistent epileptoid convulsions as are usually caused by disease in this region. Are there any indications that the vessels were affected? If the patient's account of the two fits or "strokes" be accepted, they undoubtedly point in this direction. The first would probably be due to a thrombosis; the second, that which

occurred during his residence at Farnham House, would be one of those attacks, lasting only a very brief time, and due to temporary closure of a vessel, which are by no means uncommon in syphilitic brain disease. Too much importance, however, must not be attached to these; but there is an additional argument in the fact that disease of the vessels is most commonly associated with disease at the base of the brain, of which there is here unequivocal evidence. In the first place, the ptosis and, probably, the diplopia indicate implication of the right third nerve or its nucleus, and the pupillary abnormalities show a very complicated lesion in the same locality. Thus there was Argyll Robertson pupil on both sides. This phenomenon indicates an interruption of the special tract somewhere between the retina and the nucleus of the ciliary fibres in the floor of the third ventricle. As sight was not seriously affected, this interruption must have been at some point after the special fibres have quitted the optic tract, which, according to Henschen,[a] they do by its median root, proceeding towards the superior corpora quadrigemina, where the centre for pupillary contraction to light probably lies. There must, then, have been a nuclear degeneration here, or an interruption of the fibres passing, by what route is uncertain, from thence to the nucleus of the third nerve. In addition to this there was paresis of accommodation of the right eye certainly, and, probably, of the left also, and paralytic mydriasis of the left eye, neither of these being complete. It is almost impossible that even so capricious a disease as syphilis could pick out, in the third nerve, the fibres to the sphincter iridis on one side and the ciliary fibres on[b] one or both, and of the alternatives by far the most probable is that the nuclei were affected. Further-

[a] Klin. u. Anat. Beiträge zur Path. d. Gehirns. Teil III., pp. 100 ff.

[b] *I.e.*, the fibres destined for the ciliary muscle.

more, the dilating apparatus of the pupil was also to some extent impaired, as the right pupil was small, neither responded to any sensory stimulation that was tried, and neither was fully dilated a couple of hours after instillation of atropin. The irregularity of the pupils points in the same direction. The sympathetic fibres on the two sides may, of course, have been independently affected, or the cilio-spinal region diseased; but, as the paresis was double and partial, a central lesion seems, on the whole, again to be indicated. The centre for dilatation is placed by Hensen and Völckers[a] just external to the third nerve-nucleus. A somewhat discriminating central lesion, therefore, in the grey matter of the posterior part of the third ventricle and Sylvian aqueduct, would account for all the pupillary phenomena as well as for the ptosis. The dimness of sight, if not entirely due to paresis of accommodation, may be accounted for as the result of a retro-bulbar neuritis, syphilitic, alcoholic, or tobacco, of which slight indistinctness of the margin of the disc is a recognised sign. The flattening of the face-muscles may probably be ascribed to a slight atrophic lesion of the nucleus of the seventh nerve, and, possibly, some similar process in the vagus may have been at the root of the cardiac symptoms, though tobacco and alcohol will account for them with greater probability. At all events, there can be no doubt that there was syphilitic disease localised at the base of the brain, and it seems, therefore, most probable that it was through the circulation that the cortex was affected.

Our present knowledge of mental physiology does not justify positive conclusions as to cortical localisation drawn from mental symptoms, and it is, therefore, without any desire to lay overmuch stress on the fact, that I venture

[a] Von Graefe's Archiv., Bd. XXIV., p. 21.

to point out the resemblance between the symptoms in this case and those which, according to Flechsig, will follow disease of his frontal association centre—an area comprising the greater part of the frontal and a portion of the limbic lobe. I quote the words of a pupil of Flechsig, Dr. L. F. Barker*:—"The individual may in his mind connect his personality with mental pictures which have in reality nothing to do with himself; thus he may think himself of enormous dignity, or that he is possessed of great wealth, or that he is a genius. In other cases he fails to connect his own person in any way by means of association with external perceptions, so that he may forget himself, or may fail altogether to observe his surroundings. Still in possession of numerous ideas, he may speak in an orderly fashion, although he appears unable to distinguish the true from the false, and the imagined from the experienced. Besides these logical defects he may show a diminution of his capacity for ethical and æsthetic judgment," &c. The resemblance is certainly striking, and, in addition, it may be remarked that this part of the brain is, with the kinæsthetic area, apt to be especially affected by the chronic meningitis due to prolonged indulgence in alcohol. It is possible that the tremors, the vague pains, and the increased knee-jerks may indicate, at least in some degree, affection of the motor area, though alcoholic lesions of the peripheral nerves have to be reckoned with as regards the former, and the latter is, perhaps, susceptible of a different explanation. The reading of the symptoms which I should suggest would be basal disease of slight extent, but affecting important structures, and combined with an arteritis which, although not severe, was sufficient by the lessened blood supply to produce morbid under-action, but not irrecoverable degeneration, in the cortical structures of the fore-part of the

* Johns Hopkins Hosp. Bulletin, VIII., 70 (Jan. 1897), p. 12.

brain, already weak by heredity, and further impaired by alcohol and general syphilis. That the morbid state was due to *reduced* action of the cortical structures is also shown by the fact that towards the end the patient became saner when excited.

A few words as to the other symptoms. The muscular pains and tremors, and the "pins-and-needles" sensations in the feet, were probably to a large extent of alcoholic origin. The increased knee-reflexes may have been due to lesions of the kinæsthetic area, as has been mentioned, but it is also possible that the cause was spinal, and due to a localised meningo-myelitis affecting the 3rd and 4th lumbar segments of the cord. If the belt-like pain complained of was really a girdle-pain it affords another indication that the cord or the posterior nerve roots were affected—a not uncommon occurrence, moreover, in syphilitic disease of nervous centres. But as the pyramidal tracts would have to be involved in order to increase the knee-reflexes, and there was no paralysis, it seems on the whole more probable that this symptom was cortical. So little is known, however, of some of the conditions which produce it that it is unsafe to attach much importance to the phenomenon as a means of localisation.

The enlargement of the liver, not being attended with other symptoms of cirrhosis, may be ascribed to congestion due to alcoholism and weak heart.

THE PRESIDENT said he wished to ask Dr. Dawson if he had seen many nervous cases attributable to syphilis in the earlier stages of the disease.

DR. DRURY said he would like to ask Dr. Dawson if he considered syphilis to be a very common and constant forerunner of general paralysis.

DR. POLLOCK asked Dr. Dawson if he was able to separate the

alcoholic from the syphilitic symptoms. He said that he had met with some cases of exaltation which were entirely due to alcoholism, and one which went on to paralysis and ultimately death.

Dr. Dawson, in reply, said he had not seen any nervous cases which were due to the early stages of syphilis. Such cases were very rare, and two forms of mental states occurred, at all events in secondary syphilis. One was an acute mental form, and seemed to be due to simple syphilitic meningitis. Recovery generally ensued. The second form was a weak melancholic state of mind, probably due to an anæmic condition. In answer to Dr. Drury, he had not the slightest doubt of the importance of syphilis as an ætiological factor of general paralysis. With regard to Dr. Pollock's question regarding the separation of alcoholic and syphilitic symptoms, there were certain symptoms which it would be impossible to say were alcoholic or syphilitic.

NOTE ON A CASE OF PERNICIOUS ANÆMIA.

By JAMES B. COLEMAN, M.D. R.U.I., M.R.C.P.I.;
Physician to the Richmond, Whitworth, and Hardwicke Hospitals;
Physician to the National Hospital for Consumption for Ireland.

[Read in the Section of Medicine, December 17, 1897.]

THE subject of pernicious anæmia is one of considerable interest, and to discuss the many important questions which it presents for consideration would take more time than I have at my disposal to-night. I feel all the less disposed to deal exhaustively with it, as it has been before the Academy on previous occasions. I refer particularly to a paper read by Dr. Craig before this Section in 1893.

The title of my communication is "A Note on a Case of Pernicious Anæmia," and accordingly I propose to confine myself to the clinical aspect of the disease as presented by a patient who was under my care in the Whitworth Hospital last summer. The following is his *clinical history*:—

Patrick B., aged sixty-seven, a police pensioner, was admitted to hospital on 2nd June, 1897, complaining of weakness and shortness of breath. With the exception of a severe attack of diarrhœa, which confined him to bed for about a week in November, 1896, he had not been sick for years, though he says that he has always been pale. The pallor of his skin has been increasing for the last few months, and during the same period his strength has been gradually failing. An attack of diarrhœa and vomiting about a fortnight before his admission to hospital left him much weaker and paler than before, and induced him to seek medical advice. He is married, and has three children. There is no defect as regards his manner of life or surroundings which would account for his illness, except, perhaps, anxiety due to domestic worry. His family history is favourable.

On admission to hospital his frame was that of a well-developed man inclined to corpulence. He looked younger than his stated age. His skin was smooth and waxy, of a pale lemon or cream colour, and presented the appearance of the most extreme anæmia, his nails and mucous membranes being bloodless. His hair was snow white and abundant. On his chest, abdomen, back, and upper arms he had extensive patches of a yellowish-brown colour, which microscopic examination proved to be tinea versicolar. As he lay in bed the contrast between the white sheets and his white hair on the one hand, and the peculiar pale yellow hue of his skin on the other, was very striking. There was slight œdema about his feet and legs. His temperature varied from normal to 101°, but rose to 103° on the day of his death. His breathing was very shallow, and its regularity was interrupted every now and then by sighing; the number of respirations averaged about 30; he had great dyspnœa on exertion; his lungs were sound.

His pulse was soft and compressible, and varied in frequency from 100 to 120 per minute. Hæmic murmurs were audible over the pulmonary and aortic areas, and there was a venous hum over the jugular region.

He had loss of appetite, severe thirst, and at intervals vomiting and diarrhœa. His stomach was dilated; no abdominal tumour could be detected. Examination of the vomited matter showed the quantity of the free HCl of the gastric juice to be reduced to about one-tenth of the normal amount.

The *urine* was normal in quantity, dark brown in colour, sp. gr. 1,015 to 1,018, acid in reaction, contained 2 per cent. of urea, free from sugar or albumen, gave a marked indican reaction and the urobilin spectrum; no trace of iron could be detected; ptomaines were not examined for.

He had no derangement of his nervous system; sensibility and reflexes were normal; there was no derangement of motor power beyond great general feebleness. There were sub-conjuctival ecchymoses of left eye, but no retinal hæmorrhages.

The *blood*, as it flowed from a prick in the ear-lobe or finger, was pale-pink in colour, very watery in consistence, and showed no tendency to clot. Its sp. gr., examined by Hammerschlag's method, was 1,034. Microscopic examination of a fresh specimen showed great variation in the size of the red cells, and some irregularity in shape, whilst there was scarcely any tendency to rouleaux formation. The number of red cells, as estimated by

the Thoma-Zeiss hæmocytometer, was reduced to 1,000,000 per cubic mm., and subsequently to 800,000—that is, from 20 to 16 per cent. of normal; the leucocytes numbered only 1,700 per cubic mm. The amount of hæmoglobin, estimated by Gower's hæmoglobinometer, was 30 per cent. of the normal amount, and this figure agrees with the sp. gr. of 1,034, according to the tables of Schmalz and Hammerschlag.

Stained cover-glass preparations of the blood (which were exhibited) showed a great variety in the size and shape of the red cells, there being numerous examples of—

Megalocytes (large red cells), diameter, 12–14 m.;
Microcytes (small red cells) „ 2–5 m.; and
Poikilocytes (irregularly-shaped red cells) of various sizes.

A small number of *nucleated red cells* was present, ranging in size from—

Gigantoblasts (large nucleated red cells), diameter, 12–20 m.; to
Normoblasts (nucleated red cells of normal size).

The number of gigantoblasts was considerably in excess of the normoblasts. The *leucocytes*, which were reduced in number to 1,700 per cubic mm. on admission to hospital, mounted to 21,000 on the day of his death.[a] The relative proportions of the different forms of leucocytes was as follows:—

Small mononuclear (lymphocytes) ...	46	per cent.
Large mononuclear and transitional ...	6	„
Polymorphonuclear neutrophiles ...	42	„
Eosinophiles	2	„
Myelocytes	2	„
Large, oval, mononuclear cells (diameter 21 m.) with basophile granules ...	2	„

Some of the red cells showed *degenerative changes*, such as absence of hæmoglobin ("shadow corpuscles"), a tendency to take up a mixture of stains, appearing purplish when stained by eosin and methylene blue ("polychromatophilia").

After admission to hospital the patient became progressively weaker and paler; he suffered from constant vomiting and diarrhœa, and for some days he had hæmorrhage from his gums. He gradually sank and died three weeks after admission.

Regarding treatment, arsenic was tried and had to be discontinued on account of vomiting and diarrhœa; gastric sedatives,

[a] "Terminal leucocytosis."

intestinal antiseptics, injections of water into the bowel (to relieve the thirst), nutrient enemata, and oxygen inhalations were administered to no purpose.

The *post-mortem* examination disclosed no primary lesion to account for anæmia. The body was fairly well nourished, the subcutaneous fat being in considerable quantity. The *lungs* were very anæmic, lower borders emphysematous; the *heart* contained only a trace of blood in the right side, whilst the left side was empty; almost complete absence of blood was noted throughout the entire vascular system; myocardium was very pale, there was some fatty degeneration on endocardial aspect; atheroma above aortic valves; *spleen* small, firm, red; *kidneys* pale, firm, capsule not adherent; *liver* fatty, bile capillaries filled with bile, stone in gall-bladder, cystic duct obliterated, but hepatic and common bile duct free; *stomach* and *intestines* very pale, walls atrophic; nervous system not examined.

About the diagnosis of this case there can be no doubt, agreeing as its *clinical course* did so closely with Addison's classical description of Pernicious Anæmia. The examination of the *blood* revealed the typical changes to be met with in the disease; the *urine*, as far as it was examined, showed some of the characteristic properties associated with pernicious anæmia; and the *autopsy* confirmed the diagnosis in so far as it revealed no primary lesion to account for the anæmia.

I shall not delay to discuss the pathogenesis of pernicious anæmia further than to say that it is now generally admitted to be a hæmolytic disease, and that the theory which attributes it to a tonic hæmolysis dependent on intestinal auto-intoxication best accords with the clinical course and symptoms of the disease.

Dr. Craig said that in cases of pernicious anæmia tremendous stress had been laid on the proportion of organic to normal sulphates in the urine, not only as a means of diagnosis, but also as a guide

to treatment. The amount of organic sulphates diminishes if the case is progressing well.

DR. COLEMAN, in reply, said that from a rapid examination he had concluded the aromatic sulphates to be rather in excess.

PROFESSOR MCWEENEY, DR. FALKINER, and SURGEON-GEN. POTTER all joined in the discussion.

LARYNGEAL NECROSIS IN ENTERIC FEVER.

By SIR GEORGE DUFFEY, M.D.;
President of the Royal College of Physicians of Ireland;
Physician to the City of Dublin Hospital.

[Read in the Section of Medicine, January 28, 1898.]

THE occurrence of laryngeal complications in enteric fever, and their relationship to the typhoid process, is a matter of considerable interest. Under the name of Laryngo-Typhoid, Professor C. Gerhardt, of Würzburg,[a] has described a case in which typhoid commenced as a laryngitis, and was first localised in the larynx. But more usually, and apparently much more frequently in France and Germany than in Great Britain and Ireland, laryngeal affections in enteric fever occur as a secondary complication at a late period in the course of the disease.

That the inflammation and ulceration of the laryngeal mucous membrane, which is the usual starting point of perichondritis and subsequent necrosis of the laryngeal cartilages in these cases, is of a specific or typho-genetic nature—the result of the typhoid bacillus—would appear to be a reasonable presumption. It is not one, however, I believe, that is generally accepted. Dr. P. Watson Williams,[b] in 1894, communicated to the Section of Laryngology and Otology at the annual meeting of the British Medical Association at Bristol, particulars of a fatal case of enteric fever with laryngeal ulceration, in which cultures from the local lesion yielded the typhoid bacillus. Drs. Kanthack and J. A. Drysdale[c] hold, however, that

[a] Archives of Laryngology. Vol. I., p. 121.
[b] Brit. Med. Jour. Vol. II., 1894, p. 1353.
[c] Ibid. Vol. I., 1896, p. 596.

the laryngeal lesions are undoubtedly caused by micro-organisms, and that these are pyococci, and not, with very rare exceptions, the typhoid bacillus. Lesions which are looked upon as instances of secondary infection by streptococci, such as localised periostitis, are comparatively frequent in cases of enteric fever complicated by secondary suppuration. And in some cases—which are always ones of peculiar gravity—typhoid bacilli have been found associated with streptococci.

Again, Dr. Johnson Horne[a] states that in some of the larynges of persons dying from typhoid fever the ulceration has been proved by microscopical examination to be of a tuberculous nature. Hence the tuberculous diathesis may be, in this way, a factor in the ætiology of typhoid ulceration of the larynx, one of the characteristic features of which affection is the tendency to suppuration about the cartilages leading to their necrosis.

Some (Dittrich, Ruehle) look upon the laryngeal ulcers in enteric fever, as well as in tuberculosis also, as allied in their origin and nature to bed-sores, and due partly to pressure and partly to disturbance in the circulation and innervation of the parts; and the name of "decubitus ulcers" has consequently been proposed for these ulcers.[b] Landgraff[c] considers, however, that the necrosis of the mucous membrane is a local gangrene produced not by pressure but by blood stasis. In his admirable Lettsomian lecture delivered last year,[d] Dr. F. De Havilland Hall states that he is inclined to agree with Kanthack and Drysdale in their belief that these laryngeal ulcerations during the course of typhoid fever are caused by fresh

[a] Laryngolog. Soc. Lond. Feb. 12th, 1896; and Brit. Med. Jour., ibid., and Vol. I., 1897, p. 323.

[b] Allbutt. System of Med. Vol. I., p. 819.

[c] Central. f. klin. med., No. 17. Lancet. Vol. I., 1890, p. 1135.

[d] Brit. Med. Jour. Vol. I., 1897, p. 323.

infection with pyogenic organisms which always abound in the larynx, and which gain a firm foothold on the debilitated tissues; although they cannot deny that in an individual case the typhoid bacillus may have escaped and caused the lesion.

I regret that I am unable to adduce any bacteriological or microscopical evidence, confirmatory or otherwise, of any of the views I have mentioned; but some details of a case I had recently under my care, in which, for the second time in my experience, fatal laryngeal complication occurred in enteric fever, may be of some interest.

Case.—J. S., a slightly-built, poorly-nourished, delicate-looking man, aged twenty-two years, married, was admitted to the City of Dublin Hospital on 3rd November, 1897. He stated that his illness commenced with a shivering about a fortnight before his admission, but he continued at his work as a labourer, although feeling unwell, for a week, when he took to his bed, where he remained another week, and was then seen by Dr. Hatch, who sent him to hospital. Enteric fever was diagnosed. The attack was an extremely severe one, his temperature for nine days subsequent to admission being an almost continuous one of 104°. He had also troublesome cough and some expectoration, due to bronchitis, and his bowels were at first constipated; but on Nov. 10th and 11th—probably the 20th and 21st days of his illness—he had some diarrhœa, and the light-coloured fluid-stools were passed involuntarily. All through his illness he was heavy and drowsy, and from an early period in it his pulse was quick, weak, and dicrotic. His respirations were generally 30 in the minute.

On Nov. 18th (28th day) his temperature fell to 102°. He appeared better; the cough was not so troublesome, and the expectoration had ceased. Four days subsequently (32nd day of disease) there was a further fall of his temperature to 101°. He seemed more sensible, and to be convalescing, although extremely weak.

On Saturday, Nov. 27th (37th day), a week before his death, the night nurse reported that at four a.m.—having previously slept quietly for four hours—he had had a fit of coughing, and for some minutes had found great difficulty in breathing. His temperature

fell to 97·8°, from having been 101° the previous evening. The following night he first complained of his throat, but poulticing relieved it temporarily. During the next day he seemed fairly well, although heavy and drowsy; but at night his throat again became troublesome, and his breathing so loud and stridulous that it could be heard on the landing above the ward he was in. The House Surgeon noticed that the uvula was very pendulous. His condition as regards his breathing varied considerably during the following days—sometimes better, but always worse at night and when asleep. There was also some hoarseness, and the voice was weak. No tenderness was elicited on pressure over the larynx, nor was there any swelling about it nor of the glands in the neck. My colleague, Dr. Parsons, kindly essayed to make a laryngoscopic examination, but owing to the great physical prostration of the patient, and the dependent position of the epiglottis, which was slightly injected, the glottis could not be seen.

In the event of the necessity suddenly arising, everything was kept in readiness for the operation of tracheotomy. On the night of Dec. 1st his respiration, which had been quiet during the day, became much more difficult, and there was some dysphagia. His temperature remained subnormal, and he was extremely weak. Early on the morning of Friday, Dec. 3rd, his breathing, which had presented the usual exacerbation during the night, was still so laborious and noisy that a consultation was hastily summoned to consider the propriety of an operation. The straining and exaggerated movements of the larynx were most distressing, but upon auscultation plenty of air was heard entering the lungs, and there were no threatening symptoms of suffocation and no cyanosis. It was considered, and not unreasonably, by some of the Consultants that the man was then in a dying state, and an operation was not therefore agreed upon. He improved slightly during the day, and took nourishment fairly. At midnight his temperature fell to 95°. He became much weaker and cyanosed, and died about 2 30 a.m. on Saturday, Dec. 4th, the 44th day of his illness, and the 7th day from the accession of the laryngeal symptoms.

The *post-mortem* examination showed typical typhoid ulceration, in process of cicatrisation, in the ileum, with enlargement of the mesenteric glands and of the spleen. The lungs and other organs appeared normal. The larynx (specimen exhibited) was carefully removed by my colleague, Mr. G. Jameson Johnston. The epiglottis was swollen, and there was œdema of the ary-epiglottidean folds.

The mucous membrane over the arytænoids was also swollen and injected. On the external and posterior surface of the plate of the cricoid a small dirty-yellowish spot was observed. An incision through this spot opened a small abscess, which contained about half a drachm of pus. The abscess-cavity separated the swollen perichondrium from the underlying cartilage, which was roughened and eroded. No ulceration was observed.

Seventeen years ago I exhibited, at a meeting of the Pathological Society of Dublin,[a] a specimen of necrosis of the cricoid and arytænoid cartilages, which occurred during apparent convalescence after a severe and protracted attack of enteric fever. In that case the laryngeal symptoms — which were almost identical with those in the case I have just detailed—set in on the seventy-ninth day of the man's illness, and proved fatal in seven days also. An abscess the size of a walnut was found between the pharynx and the arytænoid and cricoid cartilages, portions of which could be felt bare and loose at both sides of the abscess. No ulceration was visible in the larynx, but there was evident perichondritis and necrosis of the cartilages.

At the meeting at which I showed the latter specimen both Drs. A. W. Foot and J. W. Moore mentioned having each had a case of enteric fever under their care in which laryngeal symptoms had occurred; and Dr. E. H. Bennett described a case of laryngeal perichondritis after typhoid, in which he had successfully performed tracheotomy—the operation being necessary in consequence of an attack of violent dyspnœa. With the exception of the remarkable case brought before the Section of Pathology of this Academy by my colleague, Dr. Parsons,[b] in November, 1894, in which acute laryngitis set in suddenly on the thirty-second day of a case of enteric fever, necessitating tracheotomy, subsequent to which general emphysema

[a] Dubl. Jour. Med. Sci. Vol. LXXI., p. 555.
[b] Transactions. Vol. XIII., p. 337.

occurred, no other similar cases in Ireland have been published, as far as I know. In England, also, the complication appears to be seldom met with. It is possible that its occurrence may be often overlooked at autopsies, in consequence of the absence of any definite symptom during the patient's life pointing to the larynx. Indeed, it has been asserted by Fagge[a] that ulceration in these cases very rarely gives rise to any symptoms. Thus, in the second case of the kind reported by Dr.—now Sir Samuel—Wilks,[b] it is expressly stated that there were no symptoms especially referable to the larynx. After death a small slough was found at the back of the larynx, close to the posterior attachments of the vocal cords, and the arytænoid cartilage was also exposed.

In the first case described by Wilks[c]—the remarkable one in which general emphysema occurred—no mention is made of any laryngeal symptoms. The patient was a lad aged twelve years. About the twelfth day of his illness (typhoid fever) his neck was observed to be emphysematous. He lived for ten days subsequently. After death a sloughing ulcer was found in the back of the larynx at the junction of the vocal cords. Air had penetrated through the opening thus formed into the posterior mediastinum, and thence by the thoracic walls to the neck and other parts of the body. Von Ziemssen[d] also met with a similar case in which general emphysema occurred, in a girl of four years of age, in the middle of the third week of her fever. A perforating ulcer, the size of a lentil, was found at the base of the left arytænoid cartilage, under the left vocal cord, penetrating to the necrotic arytænoid and

[a] Prin. and Pract. of Med. Second Ed. Vol. I., p. 182.
[b] Trans. Path. Soc. Lond. Vol. XI., p. 14.
[c] Ibid. Vol. IX., p. 34.
[d] Cyclopæd. Vol. VII., p. 827.

cricoid cartilages. But during life there was "no hoarseness, no appearance of laryngeal stenosis."

As to the frequency of laryngeal complications in enteric fever—among a total of 6,513 cases of enteric fever, of which 439 were fatal, seen at St. Petersburg in the quinquennial period from 1886–87 to 1890–91, Ouskow[a] found ulceration of the larynx in about 30 per cent. Griesinger[b] met with it in 31 out of 118 autopsies (=27 per cent.). Kanthack and Drysdale, from the *post mortem* records of 61 cases, found ulceration in 26 per cent., and Zuelzer in more than 20 per cent. Hoffman,[c] as quoted by various authors, gives 28 cases out of 250 necropsies, that is a percentage of 11 only as against 30. Out of 20 cases of perichondritis given in Retslag's statistics, typhoid fever was the ascribed cause in 8; and in another series of 45 autopsies of cases of necrosis of the cartilages, also published by M. Mackenzie,[d] the cricoid—which appears to be the cartilage that most commonly suffers—was affected in four instances.

None of the cases reported by Ouskow occurred in the first week of their illness. Of cases dead in the second week, 79—*i.e.*, 15 per cent.—presented ulceration of the larynx. Of those dead during the third week, 144 (37 per cent.) presented laryngeal ulceration; of those dead in the fourth week, 89 (39 per cent.) presented ulceration. The affection is, accordingly, one that is more frequent at a late stage of the disease; and, as Trousseau has pointed out, is especially likely to occur in protracted cases of an adynamic type.

Dr. Church,[e] in the same year as that in which my first

[a] Annual Univ. Med. Sci., 1894. Vol. I., p. 23.
[b] Quoted by Parsons. Loc. cit.
[c] Fagge. Loc. cit. J. W. Moore, Eruptive and Cont. Fevers, p. 418, &c.
[d] Diseases of the Throat and Nose. Vol. I., p. 391.
[e] St. Bartholomew's Hosp. Rep. Vol. XVII., p. 104.

case was reported, recorded a case in which two small abscesses formed in the larynx, in connection with necrosis of the arytænoid cartilages, and were the immediate cause of death, which happened about the end of the fourth week of the fever. Osler[a] has seen two cases of the kind, both of which recovered—one after the expectoration of large portions of the thyroid cartilage. Hérard and others have had similar cases. Trousseau, who refers to Hérard's case, himself met with two instances only of perichondritis laryngea as a sequel to enteric fever.[b] In both of these tracheotomy was successfully performed. He quotes three other cases, all of which were fatal. The first, on the second day after tracheotomy, and the second died during the operation. The third case was not operated upon. Hölscher, cited by Pepper,[c] reports tracheotomy having been done 15 times for perichondritis in 2,000 fatal cases of typhoid fever.

As regards the question of performing tracheotomy in such cases as mine, I much regret now that I did not, in both my cases, request my surgical colleagues to consider the advisableness of operating at an earlier period in the case than that at which I did. I think that if a tracheotomy had been done as soon as the laryngeal symptoms had become urgent, and were found not to be permanently relieved by the treatment adopted, it would, at least, have given the inflamed larynx rest;[d] and would also, to a great extent, have saved the patient the exhaustion induced by the dyspnœa.

According to Theopold's statistics,[e] in twenty-two cases of perichondritis after typhus (enteric fever ?), tracheotomy

[a] Prin. and Pract. of Clin. Med. P. 25.
[b] Clin. Méd. T. I., 197. 1861. And Syd. Soc. Transl. Vol. II., 398.
[c] Text-book. Vol. I., p. 95.
[d] Cf. Hilton. Rest and Pain. 6th Ed., p. 64.
[e] Von Ziemssen. Loc. cit.

was successful eight times, so far as the preservation of life was concerned. In none of these eight patients, however, did the stenosis afterwards diminish to such an extent as to permit of the removal of the cannula. Pachmayr, quoted by Stolterforth,[a] has collected a series of 46 cases of tracheotomy for laryngitis during the course of typhoid. Of these 20 recovered.

In one of the cases referred to by Trousseau, the patient, it is said, had been subject to loss of voice before his attack of typhoid fever. The mother of the man whose case I have now brought forward told me that he always had "a delicate throat." Possibly an hereditary predisposition, or, perhaps, a previous tendency to laryngeal inflammation, may render patients who contract enteric fever more vulnerable than others to this serious complication.

In further considering the ætiology of the laryngeal complications of enteric fever, I have been struck by the circumstance that, in the reported cases I have been able to consult and in which the particulars are given, all the patients, with one exception (von Ziemssen's case), were young men. Thus the ages in Trousseau's cases were 18, 20, 22, and 17; in Wilks', 12 and 23; W. Williams', 20 and 38; Gerhardt's, 18; J. W. Moore's, 15; Parsons', 22; and my two cases, 27 and 23. Dr. Foot's case also was that of a young man.

Dr. W. G. Smith said, with regard to complications in general occurring after enteric fever, they had to deal with the difficult problem whether to regard them as distinct consequences of the typhoid poison or as comparatively accidental events prepared for by the anatomical lesions of typhoid fever, which opens an ingress to other organisms than its own.

Dr. E. H. Bennett said that he had, a considerable time ago, published the case of a man who was seized with laryngeal peri-

[a] Lancet. 1889, p. 682.

chondritis a fortnight after dismissal from hospital, where he had run through a protracted course of typhoid fever. Immediate tracheotomy was necessary to relieve dyspnœa. There was no suppuration. The tube could not be afterwards removed, and the patient wore it for fourteen years, when he died of malignant disease. He had the specimen of a second case, in which there was an abscess in the larynx following typhoid, and in the abscess lay two pieces of necrotic cartilage.

Dr. J. Magee Finny related a case where laryngeal complications set in in a patient about nineteen years of age, a strong, healthy Norwegian. The condition being unrelieved by ordinary treatment, tracheotomy had to be performed by Dr. Taylor. Recovery followed. The tube was removed in seventeen days.

Dr. Hayes said it was very curious that the records of laryngeal complications from autopsies and clinical records were so different, the number from autopsies being much in excess. This, he thought, showed that the cause of the complication was very slow and insidious. He believed that in those cases of tracheotomy where the tube could not be removed afterwards the reason was that the lesion occurred on the posterior part of larynx, where all movements in the glottis are carried out, and where, if cicatrisation should occur, the motion of the arytænoids would be impeded, and, therefore, stenosis would occur, so that the tube must be retained.

Sir C. Nixon.—If tracheotomy had been performed he thought that the symptoms would have been relieved, and probably the patient's life saved. Von Ziemssen says that laryngeal complications are much lessened by the antipyretic treatment, but he (Sir C. Nixon) had failed to see the truth of this.

Mr. Henry Gray Croly said he had performed tracheotomy on a case under Dr. Parsons, but with very little immediate relief to the patient. Extraordinary emphysema occurred in the neck and chest.

Dr. G. Jameson Johnston had seen Sir G. Duffey's case in consultation. Respiration at that time was bad, but there was plenty of air entering the chest, and no cyanosis. Muscular exertion was necessary to carry out respiration, which, along with the toxin from typhoid, he thought caused death. He would not hesitate to operate again in a similar case. He thought that the lesion was primarily a perichondritis. Had tracheotomy been performed he believed that the tube would have had to be retained

as the necrotic piece of cartilage would almost certainly ulcerate its way out through the mucous membrane at the back and lead to stenosis.

Dr. A. R. Parsons had not seen any laryngeal complications in typhoid fever till three years ago. A patient of his, twenty-two years of age, had a moderately severe attack of typhoid fever, and in convalescence complained of some difficulty in swallowing. On the following evening temperature was 104, and he had severe dyspnœa, accompanied by well-marked laryngeal stridor. Sweating and cyanosis were present. Tracheotomy was immediately performed, but with little relief, and very soon emphysema occurred, extending down to Poupart's ligament. Death fourteen hours after operation. *Post-mortem* examination showed extensive œdema of epiglottis, enormous swelling of arytænoids and ary-epiglottidean folds, with the formation of ulcers over the mucous surfaces. The ulcers were covered with something like a diphtheritic membrane, but more in the nature of a slough, and no pus was present. Microscopic examination showed this whitish material to be swarming with cocci of various kinds. He had seen Sir G. Duffey's case before the consultation, and owing to the man's prostrate condition a satisfactory examination of the larynx could not be made, as the epiglottis was dependent and could not be raised. The epiglottis itself was somewhat injected. He did not think that the great physical prostration was to any material extent dependent on the dyspnœa. He did not think that the patient would have lived had tracheotomy been performed. Such cases he thought more likely to be cases of secondary infection by staphylococci and streptococci on account of the impaired vitality of the tissues.

Sir George Duffey, replying, said it seemed to him that there were two classes of cases in which tracheotomy was necessary—one in which the complication occurs comparatively early, and the other class, like Dr. Bennett's patient and Trousseau's cases, in which the complication occurs after convalescence. Trousseau said that if the operation is to be done at all it should be done *plus tôt que plus tard*. Statistics showed that a very fair number of such cases recovered after tracheotomy. The great difficulty was to keep the larynx open after the operation. He thought that his patient's death was due to great muscular exhaustion and fatigue. He agreed with Dr. Parsons that the case was one of perichondritis, and it had been proved that the disease may occur as such without any ulceration whatever.

ACUTE GOÎTRE SUCCESSFULLY TREATED BY THYROID EXTRACT.

By RICHARD A. HAYES, M.D.;
Physician, Steevens' Hospital;
Physician for Diseases of Throat, National Eye and Ear Infirmary.

[Read in the Section of Medicine, January 28, 1898.]

A. S. [patient exhibited], aged twenty-two, applied at Throat Department, National Eye and Ear Infirmary, 14th October, 1897. He presented a soft goître involving both lobes and isthmus, which he stated was of three weeks' duration only. His neck measured 18¼ inches over tumour; pulse 84, and quiet. A loud systolic bruit, and venous murmur were heard over the tumour; there was marked dyspnœa, with loud inspiratory stridor on the least exertion or excitement, but the arytænoids moved outwards fully during quiet inspirations, but in a jerky manner. There was no exophthalmos, and the heart sounds were normal.

The patient was ordered K.I. gr. 10, tr. strophanthi ♏ 10, ter die. After a week the tumour was almost unaltered, but the pulse-rate had gone up to 96. Five-grain tabloids of thyroid extract (B. & W.) twice daily were then ordered, and at the end of a week the dyspnœa and stridor had completely disappeared, and the systolic bruit and venous hum could no longer be heard. The tumour had also somewhat decreased in size. The treatment was continued, and on December 16th, or two months after the case was first seen, the goître had almost quite gone, a slight enlargement of the left lobe alone remaining, the neck measuring 16 inches.

This case probably belonged to the exophthalmic variety of goître, and on looking over the *British Medical Journal* and *Lancet* for the past eighteen months I find five cases reported as successfully treated by thyroid extract, all being exophthalmic. I have, however, at present under my care

a marked case of this kind with extremely rapid pulse and much general prostration, in which not only did the thyroid extract give no relief, but I was obliged to discontinue it on account of unpleasant effects on the patient.

In forms of goître other than exophthalmic I have found the results of treatment by thyroid extract very unsatisfactory, but several cases have been reported as cured and improved. In the *British Medical Journal*, January, 1897, a case of "simple" goître of nine months' standing is reported as cured in three months. In the *British Medical Journal Epitomé*, 21st March, 1896, K. P. Serapin reports good results, but gives no details, and in the *British Medical Journal Epitomé*, 7th December, 1895, Marie (*Sem. Méd.*, November 13th) reports a successful case of five years' standing. He also quotes Sené and Bruns in "simple" goître, Bruns having in 60 cases 14 cures, 20 marked improvements, and 9 decided improvements. No details being given of these cases, it is possible that many of them may have been of the exophthalmic variety with goître only.

Sir C. Nixon said he had seen cases of myxœdema with complete atrophy of the gland treated with thyroid extract with extraordinary results. He understood that the administration of thyroid extract in exophthalmic goître made the symptoms worse. This was easily understood, as the giving of thyroid extract increased the amount of secretion already in excess. How was it explained that the action of thyroid extract was remediable in two opposite conditions?

Surgeon-General Potter said that he had seen many cases of simple goître when in India. The goîtres, though extremely large, did not cause the slightest trouble to the person. The swelling in the neck generally went away after one application of biniodide of mercury.

Dr. A. R. Parsons said that the case was interesting, inasmuch as the enlargement of the thyroid seemed to have occurred without

any definite cause, and in the absence of knowledge was it not possible that the whole thing should have subsided without thyroid extract as rapidly as it had come on?

The PRESIDENT said that perhaps some of the cases to which Sir C. Nixon had referred, and also Surgeon-General Potter's cases, were not similar to Dr. Hayes'. He took it that Surgeon-General Potter's cases were endemic, common in Switzerland and in some parts of England where the so-called Derbyshire neck existed. He saw a number of cases in the north of England similar more or less to the Swiss cases—namely, cretons—which Dr. Murray found were much benefited by thyroid extract.

DRS. CROLY and KNOTT also spoke.

DR. R. A. HAYES, in reply, said that their use of thyroid extract must be, to a certain extent, empirical. It would be a happy thing if they could adopt Sir C. Nixon's simple theory to explain cases of exophthalmic goître. How would he (Sir C. Nixon) explain those cases frequently met with of exophthalmic goître with cardiac symptoms excessively marked, and no goître at all present. He believed that Surgeon-General Potter's cases were of the endemic type, and he could himself bear out that, in certain classes of cases, good results were obtained from the application of biniodide of mercury, with arsenic internally. He was inclined to agree with Dr. Parsons, because he had seen cases of exophthalmic goître get well of themselves, and rapidly; but in a case like the present, where the patient was suffering from dyspnœa and nervous symptoms, he thought it only right to try and alleviate his trouble in whatever way seemed best.

A CASE OF RECURRENT IDIOPATHIC PNEUMOTHORAX, WITHOUT EFFUSION, ENDING IN RECOVERY.

By J. MAGEE FINNY, M.D. Dubl.;
Past President of the Royal College of Physicians in Ireland;
King's Professor of the Practice of Medicine.

[Read in the Section of Medicine, March 11, 1898.]

The subject of my communication is that of pneumothorax occurring in a previously healthy young man, without any effusion, and ending in recovery—to be followed by a complete recurrence, without effusion, and again by recovery. The rarity of such instances may possibly enhance its interest, and make it worthy of a place in the Transactions of the Royal Academy of Medicine.

For the following notes I am indebted to my clinical clerk, Mr. (now Dr.) William Moore, M.B.:—

Case.—J. B., aged eighteen, stableman, was admitted on the first occasion to Sir Patrick Dun's Hospital on 6th Nov., 1897. He states that up to 3rd inst. he was quite well, but that on getting up that morning he felt a heavy weight all across the top of his chest, and when going to work he was suddenly taken with so violent a pain that he had to turn back. On his return home he went to bed, but he could not remain in it from pain in his chest and inability to breathe. He found that lying on the left side increased these symptoms, and yet he was not very much better when up. This sudden illness came on without any previous illness or delicacy, strain or violence, and there was an absence of all cough or night-sweats preceding it. He says there is "no consumption" in any individual of his family, near or distant.

The day following the advent of his illness the pain left his chest almost entirely, except a slight catch in the upper part of the left axilla when he coughed. He has been ever since free from all

pain and difficulty in breathing, and he can lie equally well on either side; and, except that he had been told by the dispensary medical officer of the necessity of seeking medical care, he should not have thought himself sufficiently ill as to look for admission to the hospital.

Present Symptoms.—On admission—three days after his being taken ill—he presented no apparent evidence of any sickness in aspect, manner, or decubitus, except that his weight was but 8 st. 13 lb., and his face and neck were covered with acne vulgaris. His respirations were easy (28); pulse, 96–100; temperature, 98°.

Physical Examination.—Inspection showed the left side fuller under the clavicle than the right, while its movements on respiration were very slight. The cardiac impulse was visible in the epigastrium and to the right of the sternum, and by palpation the heart's beat was to be felt to the right of the sternum in the parasternal line. There was complete loss of vocal fremitus over the whole of the left side. *Percussion* gave a hyper-resonant note over the cardiac region, and extended from the clavicle down to the seventh rib and the costal arch in front, and to the twelfth rib behind, while it extended quite to the middle of the sternum at the manubrium, and to the right sternal line at the level of the third rib. In the interscapular region the percussion note was not tympanitic, rather dull in tone, and probably due to the condensation of the collapsed lung at its root. In this region there was slight amphoric breathing. The respiratory murmur was inaudible everywhere over the left side, and vocal resonance very badly marked. Metallic tinkling was to be heard occasionally over the lower part of the chest, but it was very indistinct, and not induced by coughing or change of posture, while the *bruit d'airain* was beautifully demonstrated. There was a complete absence of all succussion signs. At the level of the nipple measurement gave the right side 17¼ inches, and the left or affected side 16¼, or an inch less than the healthy side. On deep inspiration the right side expanded half an inch, the left side *nil.*

The heart-sounds were normal, though not heard in their natural position, but best at the fourth right intercostal space near the sternum. It was quite apparent then that the left pleural sac was full of air, filling it to its fullest limits and displacing the heart and mediastinal contents to the right of the sternum, and the stomach downwards well below the costal arch.

For a few days the metallic sounds were more or less imperfectly audible, but they then ceased. The amphoric breathing soon disappeared, and at no time throughout the patient's stay in hospital were there any signs of effusion, such as dulness on percussion in the lower region of the thorax, nor any splashing sounds. The *bruit d'airain* also disappeared about the 20th of November—that is, in about a fortnight after admission.

Progress.—The further progress of the case was unmarked by any change of symptoms, and the patient, who expressed himself as being always in the best of health, was allowed up daily, and he had an excellent appetite. His temperature was usually subnormal—about 98°, and occasionally down to 97°, and only on five occasions it was 99°—and the pulse ranged 70–80. He slept well. No medicine was deemed necessary.

Physical examination revealed that from about November 26 the air in the pleural sac was being absorbed, for in addition to the cessation of the echo sound on striking a coin—already referred to—the heart gradually returned to the left side, and on November 30th it was recorded "to be felt and heard beating in its normal position." And later on the apex beat was marked as beating in the left parasternal line, but between the fourth and fifth ribs—an inch higher than normal.

During this process of return of the heart an interesting clinical phenomenon was noticed, although the patient made no complaint, pointing to the existence of a dry pleurisy in the neighbourhood of the pericardium. Thus, on Nov. 26th a friction sound was audible over the lower $1\frac{1}{2}$ inches of the sternum, to the left of the middle line and extending into the epigastrium. The sound was that of a double rubbing character, and synchronous with the heart's sound, and yet it increased on inspiration and diminished on expiration. This, by some observers, was taken for a pericardial friction, but I considered it was exopericardial in its nature, and produced by the impact of the pericardium against the double fold of the left parietal pleura, and by the movement of the heart the layer lining the ribs and that reflected from the sternum over the pericardium came into contact, and gave rise to a friction sound. In fact, it was a rubbing of *one layer* (the parietal) against itself, and not produced by the pulmonic or visceral layer against the parietal, as is usual in ordinary pleurisy.

Along with this sound of rubbing a metallic tinkle or echo was sometimes heard in this the usual cardiac region. A few days

later (Nov. 30th) the friction sound was still more marked, and was audible from the third to the fifth left costal cartilages, and extended outwards to one inch within the nipple line, and downwards along the sixth and seventh cartilages—*i.e.*, well below the level of the returning heart. It was heard, as formerly, with the heart-sounds, though increased with the act of inspiration, and also on that day it was not confined to the time of the heart-sounds, but was audible also during inspiration.

Gradually, as the signs of air in the pleural cavity diminished, the respiratory and vocal sounds became more distinct, and were fairly audible over the back and axilla; and the left side (though it now contained the heart) measured an inch less than the right. The patient left hospital on December 17, having gained half a stone in weight and looking well and healthy.

After leaving he went back to his work as a stableman, and in a fortnight's time, as he was feeling as well as ever, he undertook some heavy lifting work with the manure fork. While thus engaged he felt a little "crackle" in the top of his left chest, but did not mind it much, until on getting out of bed next morning (December 31, 1897) he experienced a sharp pain in his left side, with great difficulty of breathing and weakness, and he fainted. He had a shrewd guess as to what had happened, as he recognised the old symptoms. He remained at home for a few days, and when admitted, on January 5, 1898, his left pleura was again found full of air, and the heart displaced to the right side of sternum, just as in November. He had no fever or any distress, and his weight was the same as when he had left hospital, December 17, 1897 (9 st. 5 lb.).

After remaining in hospital till February 3, 1898, he went home weighing the same, and the air in the left pleura was again diminishing, and the heart returning to the left. At no time was there any dulness or any sign of effusion present. The "echo note" by striking a coin was typically demonstrable for three weeks, but neither metallic tinkle nor amphoric respiration was ever noted. I did not see him again until March 4, when his weight was 1 lb. heavier, and the heart was beating in its normal position; the lower part of the left side expanded equally with the right, though it measured an inch smaller. Vocal fremitus and resonance were feeble on the affected side, and respiration was not audible under the clavicle, and in this place the percussion note was somewhat tympanitic. It suggested the idea that while the

lower part of the chest was well filled by the expanding lung the upper still contained some air in the pleura.

He was in excellent health and spirits and expected to return to work at once. I warned him against unusually heavy work for some weeks to come as a wise precaution.

There were some unusual physical signs on which a word may be said:—

1. The existence of amphoric respiration in my case in the earlier period, when the aperture was closed. It was not loud, it was limited to the left interscapular region, and it disappeared after the fifth day of residence in hospital.

Dr. West* noticed in some of his cases of so-called idiopathic pneumothorax, in which there was no effusion, that amphoric breathing was frequently audible, even when the opening is closed; but he does not venture upon an explanation. The idea that it might be conveyed from the root of the compressed lung or of the healthy lung is negatived by the fact that it disappeared in the course of the case, while those supposed factors remained the same, so far as we could make out. Moreover it was absent in the whole course of the relapse.

As Dr. Clifford Allbutt, in Quain's Dictionary of Medicine, says, "In rare cases we may detect by amphoric breathing the entrance and exit of air by a free opening, but in such cases fluid is always present as well." On the other hand it is not easy to explain its occurrence where the opening is closed, or of the valvular nature, and where there was no expansion of the side during inspiration, nor falling in during expiration.

2. Another puzzling sign was the metallic tinkle which was audible for ten days, and yet I could never satisfy myself that there was any fluid present at any time. It is therefore no longer to be taught that the metallic tinkle is solely due to

* Medical Society's Transactions. Vol. XX. 1897.

either a drop falling from the dome of the pleural cavity on the subjacent liquid, or to a bubble bursting on the surface of the fluid.

3. The other clinical physical sign worthy of attention was the friction sound audible over the lower left sternal region which was synchronous with the movements of the heart—even though increased and altered by the act of respiration—and which might readily have been called pericardial "to and fro" friction sound. I considered it to be due to the heart's movements on its return to the left side causing a rubbing, not of the pericardial layers, but of reflected parietal layers of the pleura. When the pleural cavity was fully distended with air, the left lung and overlying visceral layer of pleura were naturally retracted towards the root, and widely separated from the parietal layer; while this latter was stretched towards the right side of the sternum, as it formed the left lateral boundary of the displaced anterior mediastinum. Now, when the air of the pneumothorax was being absorbed, and the right lung was gradually expanding with deeper respirations, the heart returned towards its normal position, and carried with it the parietal layer of the left pleura, so that this exopericardial layer was folded on itself, and a friction was induced at each cardiac movement. It never extended over the whole of the præcardium, nor to the right of the sternum, and it was unaccompanied by any symptoms of pericarditis—pain, altered pulse, rise of temperature, or any discomfort—while the patient was up and about every day.

The explanation of its being intensified during inspiration is, probably, that, although the left side was nearly motionless during the act of breathing, the movement of the right side and the pressure of the right lung against the air contained in the left pleura caused an altered relation of the pericardium and the reflected layer of the *pleura costalis*, and

therefore this extra movement would intensify any friction sound made between the overlapping folds. That the movement of the left lung had nothing to say to its production was evident by the metallic echo these sounds produced, by the tympany which existed over the sternum and the front of the left thorax, and by the fact that the cyrtometric measurements of the chest, taken two inches below the level of the nipple, showed the left side to be 1⅛ inches smaller than the right; and lastly, by the heart's impulse being felt between the fourth and fifth ribs instead of in the fifth intercostal space. In fact, as I understand the pathological physiology of the process, the return of the heart was due to the diminished pressure of the absorbing air on the left side being overcome by the vigorous expansion of the right lung, and in direct proportion to that lessened pressure the ribs of the left side fell in and the diaphragm ascended.

Now, if we study the history of pneumothorax, the *cause* of the disease is at times readily explained, but at times again it is quite otherwise.

If we exclude injury to the thorax, operations, and thoracentesis, it is practically in 90 per cent. of cases the result of a ruptured lobule and its pleural covering, which had been previously weakened by ulceration, and the factor which induced the ulceration was tubercular deposit. A cavity, large or small, has existed for a longer or shorter time, and then ruptures under a little extra strain, or without any exciting cause, somewhat analogous to the occurrence of hæmoptysis as the first symptom of pulmonary phthisis being due to a prior tubercular deposit and ulceration.

There are, indeed, a few cases recorded of pneumothorax due to rupture of the air vesicles under great strain; but these are open to the criticism as to whether tubercle had not already undermined those vesicles prior to the strain and the rupture. Dr. F. de H. Hall has had thirteen cases

of pneumothorax occurring in apparently healthy persons who made recoveries in from five days to six weeks. Many of these, however, developed phthisis afterwards.

It has been asserted that emphysema may be a cause of pneumothorax, but against this Dr. West adduces a reference to an excellent paper on the subject by Zahn (Virch. Archiv., Vol. CXXIV., p. 265), in which, after a careful analysis of a large number of records, the author stated that only two cases had been conclusively shown to have resulted from a rupture of an emphysematous bulla.

The peculiarity in this present case is that the young man was not suffering in any way, or to the slightest degree, from lung disease. He had no cough, nor even slight cold, when the lung gave way, and it occurred irrespective of any unusual effort or straining on the patient's part on the first occasion of his illness. He was going to his work in the early morning, without hurry or any excitement, when he suddenly felt a pain in his left side. Unfortunately for the sake of diagnosis he was not seen until four days after its occurrence, and we are at a loss to know how severe were the symptoms, or how great the shock. Neither can have been very much, as after one day the patient complained of nothing beyond a slight pain across the sternum between the breasts, and said he felt quite well on the day of admission. On the second attack the shock seemed greater, as it induced faintness.

This is, I think, a very remarkable fact, and one which we do not sufficiently recognise—namely, that a rupture of a lung may take place, air pass through the aperture from the lung into the pleural sac, and so fill the pleura to its extreme limits that the lung is collapsed and the heart and the mediastinum displaced to the right side, without more than momentary distress of breathing and slight discomfort, without hæmoptysis, cyanosis, or much circulatory disturb-

ance. The only other causation of collapse of the lung and displacement of the heart, with which we are familiar, is the effusion of fluid in the pleura, the result of acute pleuritis; and in such cases, if at all rapidly produced, the process is always accompanied by dyspnœa, cough, and the expectoration of mucus, and very frequently the sputa are bloody, while the decubitus, when the pleural cavity is filling up with fluid, is characteristic, and these symptoms are generally in the direct proportion to the suddenness and rapidity of the lung collapse. I do not now allude to a latent pleurisy, with which we are all familiar, where the discovery of the side being full of water is unexpected; for in such cases the process is very slow and gradual. Yet in my case the left lung was suddenly and completely rendered airless, and in a day or two, except an examination of the chest had been made, the patient, so far as his symptoms were a guide, might readily have passed all notice as suffering from a grave thoracic disease.

A very similar case has been recorded by Samuel West, M.D. Oxon.,[a] which is worth mentioning in full:—

"A man aged forty-six, while at work experienced pain in his left side, and his breathing became a little short; he did not, however, desist, but kept to his work. He was seen next day by a medical man, who, detecting the signs of pneumothorax, sent him to hospital, although the man himself did not think he was ill. Physical examination revealed the whole of the left side tympanitic to the very margin of the ribs; the heart was displaced to the right, and the impulse was under the right nipple, and the left pleura was stretched 1½ inches to the right at the third rib. Amphoric respiration and the bell sound were audible in the left interscapular region.

"This patient soon recovered, gaining 14 lbs. during his

[a] Loc. cit.

stay of a month in hospital, and all the signs disappeared, though two or three slight attacks of hæmoptysis occurred. Ten years later he was at his work, and had never been ill in the interval. The chest was reported normal."

In the majority of cases the most striking group of symptoms of this disease are those due to its sudden and severe onset, such as pain in the side, dyspnœa, and suffocation, with the pallid face, clammy skin, and compressible and failing pulse of collapse. As Dr. West points out, this is the period of greatest danger, and death may be the direct result. As a rule, he says, the mortality of pneumothorax, from all causes, may be stated to be 77 per cent. Of these fatal cases 46 per cent. occur in the first week, and one-third of that number on the first day, of suffocation. Should this period be survived, death may occur from empyema or exhaustion, or lastly, the original disease, of which pneumothorax was but a complication, may make rapid strides and carry off the patient.

As already stated, my case—the subject of this communication—is a remarkable exception to these grave symptoms, although hardly so much so as the case of Dr. West's patient, to which I have referred above.

Another point of exceptionable interest to which I would specially refer in my case, is the fact that the entrance of air into the pleural sac, so great as to fill the sac to its extremest limits, was not followed by effusion, either serous or purulent. This is an extremely rare condition. It is one, however, which is well recognised, and has been noted many years ago. Probably the cause may be traced to the fact that the air was introduced through a rupture of a lung very little, if at all, previously diseased, and that the aperture was so placed that there was no free communication with the external air and the pleura after its first introduction, and thus the entrance of germs and bacteria

was limited. In almost all the recorded cases of pneumothorax where a phthisical cavity had existed prior to its occurrence, the entrance of air was invariably followed by an effusion, usually purulent in its character (pyo-pneumothorax), and this is the experience of all hospital physicians. Curiously enough, as if to point my remarks, a fortnight after this patient left hospital well, another case of pneumothorax was admitted to the same ward, and bed, occurring in a man suffering from phthisis, and this patient has had the purulent effusion, and all the evidences thereof, and died of the exhaustion and septicæmia of the original disease in eight weeks.

Dr. West in 1883 presented before the Clinical Society of London (Clin. Soc. Trans., Vol. XVII., p. 56) a series of 23 cases, compiled from various authors, of pneumothorax without effusion, in all of which complete recovery occurred, to which he added another case. Of these 24 cases, 4 were from phthisis, 4 probably of that nature, 5 were stated to have their cause in emphysema, 2 were from over-exertion in previously healthy and athletic persons, and 3 the result of injuries. As a matter of historical and local interest the first case was one recorded by Dr. MacDowel, of this city (not Dowel), and published in the *Dub. Hosp. Gaz.*, No. 15, Sept., 1856.

Dr. Brünnicke, of Copenhagen, in a valuable communication on the subject of pneumothorax, and which appeared as a translation in the *Dub. Hosp. Gaz.* (Nos. 7, 8, and 10; 1856), states that of 147 cases which he had collected and analysed, fluid was absent in but 16.

Again, more recently Dr. West (*loc. cit.*) has recorded 5 cases out of 130, in which effusion was noted for its absence. Two were phthisical, and the other three were—(1) the labourer whose case I have quoted; (2) a young man, aged twenty-two, while playing football, who had had two previous attacks of pneumothorax; and (3) a girl, aged fifteen, while dancing.

Dr. Clifford Allbutt also contributes three cases, in Quain's Dictionary of Medicine, which came under his immediate notice, and all occurred in previously vigorous men—due to a strain at an oar in one, and to gymnastics in another, and in the third the cause was unknown. All these made good recoveries.

From the foregoing facts and references I may deduce the following conclusions:—

1. That simple or idiopathic pneumothorax is a very rare disease of the lungs and pleura.

2. That a repetition of the disease in the same lung is of still greater rarity.

3. That in a very small number of cases the entrance of air into the pleura—to stretch it to its utmost limits—does occur *without any effusion* of fluid, and this even may happen a second time in the same lung.

4. That the absence of fluid renders the disease less fatal than when air and fluid are effused.

5. That the presence of air in the pleura may occur without any febrile or constitutional disturbance.

6. That in the face of such possibilities we should be cautious as to giving too grave a prognosis when evidences of a ruptured lung and pleura are present, and particularly so when there is no previous disease.

7. That the tendency of such cases is towards spontaneous recovery, and, in the absence of urgent symptoms calling for relief, it is wiser not to employ surgical means to let off the effused air.

Dr. A. R. Parsons said Dr. Finny had taken away the explanation of metallic tinkling as it was usually taught. What was his explanation for it? Did he not think it just possible that there might have been a small amount of fluid in the pleural cavity sufficient not to be detected by physical signs, but sufficient to cause the metallic tinkling on the old hypothesis?

Dr. Knott said it occurred to him if there was an opening into a cavity containing air, and there was some moisture in the opening, that during inspiratory efforts a little drop of moisture might be drawn in to create metallic tinkling.

Dr. R. Travers Smith, referring to the diagnosis of effusion complicating cases of pneumothorax, said that Sir Douglas Powell pointed out that it was not quite so easy to exclude effusion into the pleural cavity in cases of pneumothorax because the suction action of the negative pressure in the interior of the thorax helped in sustaining the diaphragm in its dome-shaped position. In pneumothorax the negative pressure in the pleura ceased to exist, and the suction action on the diaphragm was lost, and a more or less crater-shaped sinking occurred at the top of the dome in which fluid might lodge, and so might escape detection from percussion, but this, Dr. Finny could say, would not prevent the occurrence of hippocratic succussion, which was not found in his case.

Professor E. H. Bennett was glad to hear Dr. Finny uphold the practice of avoiding surgical interference in such cases as far as possible. He had seen many cases of pneumothorax, but only one which called for puncture of the thorax. In this one exception the patient, a man with a fractured rib, began to develop general emphysema, and after a short time, for some unknown reason, the emphysema stopped developing, and the pleura began to fill with such a degree of tension that the man began to be strangled. A puncture was made with small trochar and canula, and the air rushed out with great speed. Complete relief followed without any complication.

Dr. Finny, in reply, said that he did not know that he was obliged to give an explanation of what had occurred in his case, because he did not believe that the explanation of the metallic tinkling was due to a drop of water falling down or a bubble breaking on the surface; but it was quite possible that it might have been a mucous bubble in the tube, and not one blown out through a hole in the lung; that in some of the bronchial tubes there might have been a little draught of air, and some bubble might have been present there, and given rise to the metallic tinkling. In the neighbourhood of a large chamber any sound would get a metallic ring; therefore it was possible that there might have been some slight bubbles in the deeper tubes giving rise to the metallic tinkling. As to Dr. Parsons' question about the production of the friction sound when there was no fluid or

pleurisy—well, he (Dr. Finny) did not say there was no pleurisy, but it was quite possible to have a little slight lymphy exudation on the surface without a quantity of fluid in the lower part of the chest, and although Dr. Smith had referred to the possibility of not finding fluid in the lower part of the chest on account of the shape of the diaphragm, he thought there was hardly enough fluid even there to explain the occurrence of the metallic tinkling. No succussion could be detected on careful examination. Dr. Bennett had touched upon a very important surgical question. He (Dr. Finny) thought it right to say that Dr. West referred with great credit to the early operation on pneumothorax as being the means of saving so many lives.

CYSTINURIA.

By WALTER G. SMITH, M.D.;
Ex-President Royal College of Physicians, Ireland;
Physician to H. E. the Lord Lieutenant.

[Read in the Section of Medicine, May 11, 1898.]

One of the most fruitful fields in physiological chemistry is that devoted to the study of the metabolic processes that go on in our bodies. Much light has been shed upon obscure and interesting problems. We have been enabled to pry into some of the secrets of nature's laboratory, and have obtained here and there clues to guide us through the dim mazes of secretion and excretion.

Thus the gain to physiology has been great; and if we turn our eyes to pathology we see that we have found new outlets for research, have learned to distinguish between the primary and secondary action of certain pathogenic agents, and the skilled examination of the urine has taught us a good deal as to the course of morbid processes and has explained many curious and notable features of disease.

Toxicology and scientific therapeutics have likewise benefited by the labours of the young but active school of physiological chemistry. We can the better comprehend the mode of action of certain poisons, and the therapeutic working of many of our trusted remedies.

The modes or forms through which drugs are excreted are of great significance in relation to a due apprehension of their therapeutic influence, and help to explain difficult questions, such as the theory of cumulative action.

These remarks apply naturally with chief emphasis to the

aromatic group of chemical compounds. For in this great group, as contra-distinguished from the fatty (aliphatic) series, we have to deal with a nucleus—viz., a benzene derivative—which rarely undergoes complete destruction, and is not broken up, as are the fatty derivatives, into simple final products, such as CO_2, H_2O, urea, &c. But this nucleus preserves its individuality through many mutations, and the products of elimination emerge from the body retaining their "aromatic" constitution, and hence preserving, more or less, an essential continuity of therapeutic action. We daily make use of this principle in the domain of urinary therapeutics.

Among the curious metabolic products occasionally found in urine three examples may be cited:—

	Origin.
1. Alkaptonuria	Enterogenous
2. Diaminuria	Enterogenous
3. Cystinuria	?

Of the first of these, the so-called *alkaptonuria*, I have met with but one undoubted case, which was published in the *Dublin Journ. of Med. Sci.*, June, 1882. The urine was derived from a little girl, aged three years, apparently in perfect health, and not taking any medicine whatever. When first passed the urine was normal in appearance, but on being allowed to stand it deepened in colour and stained the linen. Under the influence of alkalies the urine assumed a deep brown colour, advancing from above downwards, and possessed slight reducing power over salts of copper, bismuth, and silver. The term *alkapton* (alkali; κάπτω) was introduced by Bödeker in 1861 (*Ann. Chem. u. Pharm.*, 117, Jan., 1861) to designate the supposed body which conferred these characters upon urine, and which he had noted for the first time in 1859. Since Bödeker's observations a few additional cases have

been reported by various observers, probably not a dozen in all.

Further chemical investigation has disproved the specific existence of "alkapton," and has shown that under this name are included several members of the aromatic series.

The property of darkening upon exposure to the air, especially in the presence of alkalies, is common to many hydroxy-derivatives of benzene. In a minor degree it is possibly not a very rare phenomenon in urine. So far as our knowledge goes, this condition has been definitely associated with one or other of three compounds :—

(*a*) Pyrocatechin, $C_6H_4(OH)_2$ (Ebstein and Müller, Fürbinger, Fleischer).

(*b*) Homogentisic acid, $C_6H_3(OH)_2 \cdot CH_2 \cdot COOH$:= dihydroxy-phenyl-propionic acid. This appears to be the chief compound present.

(*c*) Uro-leucic acid, $C_6H_3(OH)_2 \cdot CH_2 \cdot CH(OH) \cdot COOH$ = dioxyphenyl-lactic acid (Huppert: *Ztsch. f. phys. Chem.*, 1897).

Alkaptonuria is not specifically linked with any particular morbid condition. The source of homogentisic acid is possibly the decomposing action of special micro-organisms upon tyrosin in the bowel.

Diaminuria—i.e., the occurrence of basic diamines in the urine—is a more recent chemical acquisition. Diamines (type $\begin{matrix} H_2) \\ H_2 \\ H_2) \end{matrix} N_2$) never occur in healthy urine or fæces, nor have they been detected in the urine of acute febrile diseases. But Brieger has shown that diamines arise under certain conditions of putrefaction, and also in cultures of some specific bacteria—viz., the cholera bacillus, and the Finkler-Prior vibrio. Hunter has detected them in connection with pernicious anæmia.

In 1887 Udránsky and Baumann made a novel and most

interesting observation. In the urine of a patient affected with cystinuria they found considerable quantities of two diamines regularly throughout the greater part of a year. Two compounds were isolated from the urine and shown to be identical with two of the ptomaïns discovered by Brieger and named by him *cadaverin* and *putrescin.* Cadaverin is penta-methylene-diamine, $(CH_2)_5''H_4N_2$. Putrescin is tetra-methylene-diamine, $(CH_2)''H_4N_2$.

Other observers—*e.g.*, Stadthagen and Brieger (*Berl. klin. Woch.*, 1889, p. 16)—have confirmed these results, and found the same bases, chiefly the penta-compound, in the urine from cases of cystinuria. But the contents of the bowel in cases of cystinuria are free from cystin, and we are as yet unable to satisfactorily explain the singular concurrence of cystin with diamines.

Two cases of *cystinuria* having chanced to come under my notice in private practice—the only ones hitherto reported from Ireland—I am tempted to make a few remarks upon the subject. All are agreed that cystinuria is an occurrence of exceptional rarity, and Golding Bird states that within his knowledge cystin had been found in urinary sediments by very few observers. I have not seen it mentioned in any of the Reports of the Clinical Research Association.

Nearly ninety years have elapsed since Wollaston announced the discovery in a urinary calculus of a new substance, which was christened "cystin."

In the pathological museum of Trinity College, Dublin, Professor E. H. Bennett has half of a large cystin calculus, and Dr. J. Harrison Scott recently exhibited at the Biological Club a beautiful specimen of a cystin calculus voided by a gentleman under his care. It measured 11 mm. in length by 7 mm. in its widest part. The surface was yellow-brown, like sugar-candy, and sparkled with

brilliant crystals, which under the microscope exhibited the characteristic crystalline form of cystin. A freshly exposed surface was pure white. The white deposit from this patient's urine consisted almost wholly of hexagonal crystals of cystin.

Whether cystin calculus can be formed without cystin having at any time obviously occurred in the urine, is, perhaps, an open question, but it is certain the elimination of cystin may go on for years without leading to the formation of calculus.

Considering the innumerable observations which are daily made upon urine by skilled observers, together with the distinctive and easily recognised crystalline form which cystin assumes—for it is never amorphous—it would not be likely to be overlooked. Yet at the present time it may be safely said that not more than from seventy to eighty cases of cystinuria have been reported—*i.e.*, less than one for each year from the date of its discovery.

Let me now briefly relate the particulars of the two cases which have come under my notice in 1890 and 1897 respectively. The first case has been already published (*Trans. Roy. Acad. Med. in Irel.*, 1891) and I shall therefore only summarise it.

In November, 1890, a boy, aged eight years, was brought to me for a trifling ailment. He had previously been under my care for ringworm of the scalp, but was otherwise in excellent health. For some time past the child's mother noticed that his urine had peculiar characters. It deposited a *greenish* sediment, and possessed a fragrant odour, which she likened to that of orris root. Nothing similar was observed in the urine of either of his younger sisters.

The boy's urine was examined microscopically upon several occasions, and only once was cystin found, and fairly abundant in the deposit, scattered through numerous

minute crystals of triple phosphate. The reaction varied from acid to alkaline, and the crystals correspondingly found were those of uric acid and of triple phosphate and calcium carbonate.

The second case presented itself in 1897. A stout lady, aged about fifty-two years, consulted me in October, 1897, for pains in the left leg. She had previously suffered from rheumatic pains and stiffness in the knees. Two years ago she had had pain down the right leg, followed by some muscular wasting. In other respects her general health was good.

The urine when first examined was alkaline, pale, turbid, and was free from albumen and sugar. It effervesced very briskly in the cold with dilute acetic acid, and the microscope showed numerous biscuit-shaped discoids of calcium carbonate. No phosphatic crystals. Two days later I examined another specimen of the urine. It was feebly acid, sp. gr. 1025, was of a greenish-yellow colour, and deposited a white sediment. Under the microscope this was seen to consist almost wholly of bright, colourless, six-sided crystals of cystin. They were insoluble in acetic acid, and soluble in ammonia. Intermixed were some very small crystals of calcium oxalate.

Another sample of urine, passed six days later, was faintly acid, and deposited a flocculent sediment. No crystals of cystin could be detected in this specimen after centrifugalising or after addition of acetic acid. I lost sight of this case subsequently. The two cases may be thus contrasted:—

Case 1, 1890.	Case 2, 1897.
Boy, aged 8 years.	Lady, middle-aged.
General health excellent. Sediment from urine slate-coloured. Cystin not very abundant. Cystin transitory.	General health good. Rheumatic. Sediment white, almost entirely composed of cystin. Cystin transitory.

The above cases appear to lend some support to the statement of Neubauer and Vogel (*Analyse des Harns*, 1890, p. 167) that cystin occurs in the urine of many persons up to the extent of 0·5 grammes per diem. Nearly half a century ago Golding Bird was led to the conviction that "the urine in many cases of depressed health, in strumous patients especially, not very infrequently contains crystals of cystin, not sufficiently abundant to form a distinct deposit, but still obvious enough on microscopic examination" (*Urinary Deposits*, 1851, p. 18).

We may also note in the foregoing cases the sex of one of the patients, and the sudden disappearance of cystin from the urine in both. Cystinuria is about twice as common in males as in females, and has rarely been observed after fifty years of age. Cystin has perhaps been more frequently noticed as a persistent deposit for months or even years, but intermittent cases have also been recorded, and into this category mine appear to fall.

Some uncertainty existed for a time as to the exact chemical nature of cystin, but this may now be considered as well established.

Chronologically, the steps in our knowledge of the chemistry of cystin stand thus:—

(1) It was at first believed to include only four elements—C·H·N·O.

(2) Then it was ascertained to contain 26·6 per cent. of sulphur.

In the earlier analyses of taurin the sulphur was likewise overlooked.

(3) Its correct empirical formula was established as $C_3H_6NSO_2$, agreeing with the formula proposed long ago by G. Bird.

(4) Its constitutional formula was determined. It is a sulphuretted amido-acid, and is related to lactic acid

(fermentation). This readily appears from the subjoined formula:—

Lactic acid = $\left\{\begin{matrix} CH_3 & & OH \\ & C & \\ H & & COOH \end{matrix}\right.$

Cysteïn: a base soluble in water $= \begin{matrix} CH_2 & & SH \\ & C & \\ NH_2 & & COOH \end{matrix}$

Cystin, derived by oxidation from cysteïn, two molecules being condensed.

$$\left[\begin{matrix} CH_3 & & S & & S & & CH_3 \\ & C & & & & C & \\ NH_2 & & COOH & & COOH & & NH_2 \end{matrix}\right] = (C_3H_6NSO_2)_2.$$

Cystin is easily reduced by nascent hydrogen to cysteïn, $C_3H_7NSO_2$.

In regard to the pathology of cystinuria we can scarcely go farther than to say it is a product of peculiar disordered metabolism, which is apt to occur in several members of the same family.

Goldmann and Baumann's observations (*Ztschr. f. physiol. Chem.* xii.) seem to show that traces of cystin or a cystinoid body occur normally in the urine of men and dogs, and are the precursors of part of the so-called "neutral" sulphur compounds of the urine. From this point of view we should look upon cystinuria as an exaggeration or, at most, a modification of a physiological condition. Moreover, in dogs under normal metabolism, a sort of artificial cystinuria can be induced; and cysteïn saved from its usual fate of oxidation into sulphuric acid is excreted as a conjugated compound (Baumann and Preusse: Jaffé).

The following conclusions embody the chief points which have been made out within recent times in regard to cystinuria.

(1) Cystin is a product of proteid metabolism, probably the result of a synthetic process.

(2) It has no relation to uric acid, or to gout or rheumatism.

(3) It is in no way connected with taurin, which is a sulphonic acid $C_2H_4(NH_2)SO_3H$.

(4) Its probable forerunner in the body is cysteïn, which is a strong base soluble in water.

$$2C_3H_7NSO_2+O=(C_3H_6NSO_2)_2+H_2O.$$

(5) Traces of cysteïn, or of a body closely related to it, occur normally in urine.

(6) The sulphur of the cysteïn is, as a rule, oxidised into SO_4 (ordinary and ethereal).

(7) Under certain unknown conditions cysteïn escapes full oxidation, and is partly execreted as cystin.

(8) Cystinuria has been found to be associated with diaminuria by several observers.

(9) Cystinuria may be intermittent or occasional.

(10) Cystinuria and diaminuria are possibly due to a common cause—viz., peculiar intestinal micro-organisms.

(11) Therapeutically, the indication is to disinfect the intestine.

Mr. M'Causland, referring to the connection between cystinuria and diaminuria, asked if Dr. Smith meant to say that in people suffering from ptomaïn poisoning cystin is found in the urine? Was it not possible that cystinuria was more common than supposed on account of the possibility of its being overlooked? Dr. Smith said that cystinuria had nothing to do with rheumatism. In Dr. Smith's second case the lady suffered from rheumatic pains; had that nothing to do with the case?

Dr. J. W. Moore said he possessed records of about 2,500 analyses of urine by his father, who recorded two cases of cystinuria. Since his father's death in 1871 Dr. Moore had seen two cases himself. About a year ago Dr. Craig had a very interesting case, in which the hexagonal crystals were beautifully seen; so that altogether out of about 3,700 examinations of urine there were about five cases.

Dr. E. H. Bennett said that he had many years ago determined a deposit of crystals in a specimen of urine to be cystin, on account

of his having obtained the same results on chemical treatment as he had obtained in the case of a calculus which he knew to be composed of cystin.

Dr. W. G. Smith, in reply to Mr. M'Causland, said that the word ptomaïn had a very wide significance. The word diaminuria was only a particular case of ptomaïn, and, therefore, cystinuria could not always be expected to be associated with diaminuria, inasmuch as it was only proved to be associated with diamines, of which the names are cadaverin and putrescin. Cystinuria was, therefore, associated with particular species of ptomaïns, but not ptomaïns in the general sense. With regard to the frequency of its occurrence, they had already heard Dr. Moore's and Dr. Bennett's remarks. Many years ago Golding Bird expressed the conviction that in the urine, in many cases of depressed health, it was not a very uncommon thing to meet with crystals of cystin. He would lay no stress on the occurrence of rheumatism and cystinuria together in the case of his second patient—an old lady—as rheumatism in old ladies was very common and cystinuria very rare.

ACROMEGALY.

By W. J. THOMPSON, M.D. Univ. Dubl.;
Physician, Jervis-street Hospital.

[Read in the Section of Medicine, March 11, 1898.]

Since Marie first described acromegaly in 1886 comparatively little advance has been made as to the nature of its cause, and from the analysis of over 125 published cases nothing very definite has been arrived at. It would seem to occur rather more frequently in females than in males, and in the former is generally associated with menstrual disturbance, usually cessation of the menses. It has followed anæmia, influenza, the exanthemata, rheumatism, syphilis, and traumatism, and in a considerable number of cases it comes on apparently without any cause. It occurs at all ages—Osler states between 15 and 50 years, Starr reports a case at the age of 14 months, and Gould in last year's Book of Treatment mentions a case in a patient aged 70 years.

The symptoms are now pretty accurately defined, and are so well known and readily recognised that it is only necessary to mention the most characteristic—viz., hypertrophy of the bones of the hands, feet and lower part of the extremities, with thickening of subcutaneous tissue; hypertrophy of the cranial and facial bones, and sometimes of those of the vertebræ and thorax; kyphosis of the upper portion of the spine; enlargement of the nose, lips and ears; sometimes atrophy of the optic disc; loss of sensation of smell and taste; intellect always clear.

The pathology of acromegaly is still obscure; the enlargement of the bones is simple hypertrophy; what the hyper-

trophy is due to, or why certain bones and certain parts of other bones are always enlarged, and others not affected, has not yet been explained. If the changes are due to a toxin, or if they are neurotic, why are certain tissues more affected than others? The thyroid gland is often hypertrophied, seldom atrophied, and the thymus sometimes in young subjects hypertrophied. The pituitary body is the organ most constantly affected, and in fully 90 per cent. it is found enlarged. Dr. Piercy Fournivall, in a paper read last year before the Pathological Society of London, gave an analysis of 34 necropsies. Out of that number the pituitary body was found enlarged and affected in 31 cases; in the remaining 3 cases, although it was diseased, there was no enlargement; in one the gland was the seat of a softened adenoma, in the second there was a necrosis with softening, and in the third there was atrophy with fibrosis. Of the 31 enlargements 5 were simple hypertrophies, 5 adenomas, 4 sarcomas, 3 tumours not specified, 2 tumours containing fluid, 1 a glioma, &c. From this it will be seen that the changes in the gland differ widely, and are such as are commonly met with in cases of lesions of this body not clinically associated with acromegaly. Hence investigations of this gland have thrown very little light on this disease.

The diseases acromegaly is likely to be confounded with are—

1. Myxœdema.
2. Osteitis deformans of Paget.
3. Hypertrophic pulmonary osteo-arthropathy.

The thick, heavy lips and broad, deformed face have led to confusion with the first, but the true bony enlargement instead of subcutaneous thickening and the free perspiration readily distinguishes it; from osteitis deformans—in which the shafts of the long bones and the bones of the head are chiefly involved—by the hypertrophy of the bones of the

hands, feet and face; from hypertrophic pulmonary osteo-arthropathy by the absence of any pulmonary trouble.

The disease may be acute, and may only last 2 or 3 years; it may be chronic, and last from 25 to 30 years; or it may be intermediate, lasting 10 to 15 years. The treatment up to the present has been unsatisfactory, and will remain so until something more definite is known of its cause. Temporary improvement has been reported from pituitary extract, from thyroid extract, and from such tonics as arsenic, iron, &c. As yet no drug or extract has been found to have any specific effect. One attempt was made to remove the pituitary body by surgical means, which resulted in failure.

Case.—E. D., aged nineteen years, was admitted to Jervis-street Hospital on 29th November, 1897. Both her parents are living and strong and healthy. She has six brothers and one sister, all in good health. One sister died after an operation for a diseased knee-joint, probably tubercular. She herself enjoyed good health until she was fifteen years old, when she had a severe attack of influenza. From this she recovered without any complication, and shortly afterwards her menses appeared and continued regular for two years. They then stopped, and have not since appeared. At that time she was suffering from anæmia, but the anæmia disappeared under treatment after a short time. Some twelve months ago she felt an uneasiness—not actual pain—in both her hands and feet, and noticed that they seemed slightly larger than usual. Since that time the enlargement has been getting more pronounced, and has extended to the wrist and ankle-joints and lower part of the extremities. She has also noticed her voice getting thicker and for the past three months her spine becoming curved. Her appetite throughout has remained good, and she considers herself in average health.

Her condition on admission was as follows:—Medium height, well nourished, dark complexion, with rather an apathetic aspect and well-marked spinal curvature. The bones of the lower third of the forearms, wrist-joints and hands were enlarged, the skin and subcutaneous tissue thickened, the nails broad, smooth and convex. The lower half of the tibia and fibula very much hypertrophied, particularly about three inches above the ankle-joint;

the bones of the feet are also enlarged. The kyphosis is particularly prominent in the dorsal region. The bones of the head and face are slightly enlarged, and the nose, lips and ears are considerably increased in size. The horizontal position of the inferior maxillary bone is not as usual very prominent. The tongue and eyebrows are apparently normal. The thyroid gland is, if anything, decreased in size, and no enlargement of the thymus can be made

out. The heart, lungs and abdominal viscera are healthy and normal. There is no loss of sensation of taste or smell. There has been no elevation of temperature, and the skin acts excessively. The urine, on examination, was found loaded with urates; sp. gr. 1025; no trace of albumen or sugar. Her eyes have been tested and found practically normal; no disease at fundus. The uterus and cervix are small—in fact, infantile; the ovaries and tubes are normal; the labia minora and majora, also the mammary glands, are badly developed.

Since her admission to hospital, on several occasions she complained of headache, lassitude, pains in extremities, with a feeling of swelling in them, no pyrexia, and felt so ill that she was obliged to remain in bed. The headache and pains passed away in two or three days, but the swelling in the extremities remained. She affirms this is how the enlargement takes place, not slowly and imperceptibly. The interval between the attacks may be two or three weeks, and during that time she seems in fair health. Usually in the evenings there is considerable œdema about the

ankle-joint. She has been taking pituitary extract for some time now, but if anything her condition is aggravated.

The points of interest about her case are—

1. Short duration, coming on quickly, and coming on without any cause.

2. The bones of the lower part of the extremities are more hypertrophied than those of the hands and feet.

3. The atrophy of the genital organs and the well-marked kyphosis.

4. No great defect of vision.

5. No great enlargement of the bones of the head and face, and none of the tongue or eyebrows.

Mr. M'Causland asked what conditions Dr. Thompson and Dr. Bewley considered as being typical of this disease. Not long ago he had under his care a patient with a large cystic tumour under the jaw, which was removed. The patient presented certain conditions, apparently very like those of acromegaly. There was great enlargement of the hands, feet, head, and bones of face, hoarseness of voice, but no headaches or pains. Eyes, thyroid, and urine normal. Dr. Thompson's case did not at all come up to his ideas of what acromegaly should be. For himself, he did not offer any suggestion, except that the girl might be suffering from some form of tuberculosis or rheumatism. As to Dr. Bewley's case, he (Dr. Bewley) seemed to think that the fact of the man being what was commonly termed "undershot" was a symptom of acromegaly.

Dr. Thompson, in reply, thought that the symptoms described by Mr. M'Causland would fit in with the usual symptoms of the disease. He did not say that kyphosis was present. He (Dr. Thompson) did not think it was tubercular disease, as the girl had been suffering for a year and a half, and some symptoms would have developed. He did not think it was rheumatism, as there would likely have been some pyrexia and pain.

Dr. H. T. Bewley said it was really very hard to say what were the typical signs of acromegaly. The symptoms in his case fitted in with the usually-described symptoms. Marie, however, mentioned that such cases were not acromegaly unless there were eye symptoms, which were absent in his case.

A CASE OF CEREBRAL ABSCESS.

By JOHN J. BURGESS, F.R.C.S., L.R.C.P.

[Read in the Section of Medicine, April 15, 1898.]

THE following case is deserving of interest from the fact that such an extensive lesion of the membranes and cerebral cortex presented so few physical signs with the continuous prevalence of the one symptom :—

CASE.—A. D., aged thirty-six, of intemperate habits, was admitted as destitute to the North Dublin Union, and sent to a hospital ward suffering from persistent headache.

I saw him about three months before his death—a year and nine months after his admission—and my interest was attracted by the constant presence of the pain, despite all treatment, during his time in hospital.

It was with some difficulty I could elicit a history. When asked a question he would, after an interval, answer in a few words, which effort appeared to increase his distress; then to escape further worry would turn over and feign sleep.

After several endeavours the history may be summarised as follows :—

From early manhood he had been an inveterate drunkard. When in this condition he was quarrelsome, and on at least two occasions he received injuries to his head, which had the effect of stunning him. He dates the beginning of the headache from a blow from a stick on the right side of his skull, causing a lacerated wound, from which accident he never recovered sufficiently to resume his occupation, was obliged to go to hospital, and, except for very brief intervals of relief, has been in the same condition ever since. I learned from the attendants that lately he had six convulsive seizures, the spasms being left-sided.

This is a doubtful point, since not having seen him in a fit myself I should be dubious of the ability of the people in charge of union wards to recognise unilateral spasms. He was able to get from his bed to the night chair, sometimes assisted, sometimes not,

and beyond feeling weakness in his legs had no paralysis of either extremity. His face presented a dusky pallor; his skin was dry; body emaciated; no œdema; temperature subnormal—97.

Pulse of low tension, full, 72–78; heart-sounds indistinct, but free from murmur; impulse in 5th space very weak.

He had cough, evidently pharyngeal, with stringy mucus.

Both lungs were normal, the breathing being slow and superficial.

The tongue was whitish, without marked fur; there had been no vomiting; bowels constipated; passed about 50 oz. urine daily, sp. g. 1·014, containing about 50 per cent. albumen, no sugar.

The surface of his body was hyperæsthetic all over.

The pupils were slightly dilated, but even, and barely acted to light.

Knee-jerks.—The leg reflexes acted slightly, but were soon lost on the left side with motion.

The headaches, he explained, seemed to start backwards and forwards from his right temple to his occiput, and then from over the entire head; he never got a perfect sleep—dozed for a short time, to be again awakened by the pain or any noise in the ward. Thus he spent most of his days and nights. He kept his eyelids closed, answered questions in a whining tone, after an interval, allowing a pause between each word. He presented no hemiopsia.

I regret I was not able to get an examination of his retinæ by a specialist; the gentleman who promised to come was unable at the time to attend.

However, taking the symptoms and physical signs at this time, there was motor weakness of the left leg. With the history of injury of the right side of head and alcoholism it was evident that I had something more than an uræmic headache to deal with.

The Jacksonian epilepsy, right side headache, and paralysis of left lower extremity pointed, in my opinion, to either an abscess or tumour implicating the convolutions at the uppermost part of the Rolandic sulcus. Accordingly I sent for the man's relatives, and told them I conscientiously believed that the one chance for the man's life was an

operation. To this, unluckily, they would not agree, and to this I am indebted for the specimen now exhibited. The autopsy was by their wish confined to the cranium and its contents.

The external surface presented two depressions—one in the middle line, just above the supra-orbital ridges, a sharp depression as if a piece of bone had been chipped away. There was, however, no scar on the skin-covering, and this, for aught I know, may be an uncommon but non-traumatic condition.

The second was just over the right parietal eminence, and was undoubtedly traumatic; the outer table was bent in over a space about the size of a shilling.

On lifting the skull the dura mater was not adherent, except in the vicinity of the second depression, where it was adherent and thickened over a space about three inches square. So hardened was it that at first I believed it to be a tumour underneath, until carefully removing it at the circumference a jet of greenish pus shot out.

Over the whole vertex the dura mater exhibits great thickening, and is completely adherent to the cerebral cortex for about one and a half inches to the left and for three inches to the right of the middle line, on which side the thickening is much more marked.

Transverse sections through the thickened membranes and subjacent cortex revealed a cavity containing, in the recent state, a bright greenish pus. This collection did not extend anteriorly beyond the posterior part of the ascending parietal convolution—*i.e.*, encroached slightly, if at all, on the Rolandic area, being about an inch distant from the middle line.

As the site of this fluid was traced backwards—at first situated immediately beneath the membranes—it seemed to burrow somewhat into the brain substance, and in the

occipital lobe, towards its termination, was roofed in by a thin layer of cerebral cortex. The cavity did not exceed an inch in diameter in any part of its course, becoming much narrower posteriorly.

The layers of membrane enclosing the superior longitudinal sinus shared in the general thickening, and, though patent anteriorly, from the point where the abscess seemed to originate to its termination in the lateral sinus, its lumen becomes completely obliterated, exhibiting a condition of complete thrombosis.

Dr. E. H. Bennett thought the specimen a very remarkable and very rare one of chronic abscess of the brain, existing and giving sufficient characteristic symptoms for over two years. Probably a blood clot in the arachnoid was the primary lesion, and suppuration took place in it. He thought that operative interference would have had a bad result in the case.

Dr. Falkiner asked Dr. Bennett why he thought that operative interference would have produced a more rapid fatal result? He himself would have been in favour of surgical interference.

Dr. Knott gave a case of cerebral abscess in which the distinct symptoms were persistent headache, sleeplessness, a feeling of being miserable, and constipation. These symptoms were present for months, and subsequently the usual symptoms of lesion in base of brain developed, and patient died comatose. *Post-mortem* showed the base of brain quite normal, but nearly the whole of one cerebral hemisphere was excavated by a cerebral abscess. It had often occurred to him that a good many of the misleading factors in regard to the localisation were owing to the fact that the brain is soft and partly a semi-fluid substance, and would partly obey Pascal's law of pressure, causing the pressure to extend all around.

Dr. J. J. Burgess, in reply to Dr. Finny, said that he had believed the case to be possibly one of abscess from the duration of the pain. Tuberculosis might be put out of the question. Another reason was the slow cerebration exhibited. There was distinct loss of knee-jerk on the left side. He thought the Jacksonian epilepsy and continual headache justified an operation.

LARYNGEAL ULCERATION IN THE ADVANCED STAGE OF TYPHOID FEVER.

By J. MAGEE FINNY, M.D. Dubl.;
Past-President of the Royal College of Physicians in Ireland;
Physician to Sir Patrick Dun's Hospital.

[Read in the Section of Medicine, April 15, 1898.]

Sir George Duffey, M.D., Pres. R.C.P.I., read a valuable and exhaustive paper on the subject of laryngeal complication in typhoid fever[a] before the Royal Academy of Medicine, on Jan. 28, 1898, in which he gave the details of a case under his care, which had ended fatally on the forty-fourth day of his illness and the seventh day from the accession of laryngeal symptoms.

In the discussion which followed the reading of his paper, I made a short reference, from memory, to a similar case which had occurred under my care at Sir Patrick Dun's Hospital. My recollection of many of the details was at fault, as two years had elapsed since the case had been under treatment, and I had not looked up the notes of it in the meantime.

I now present an abstract of the case, taken from the Hospital Records by Dr. Littledale, House Surgeon, as I believe it will prove an instructive additional contribution to the literature of this rare and dangerous complication of typhoid fever.

Case.—A. J., a Norwegian sailor, aged about twenty, was admitted to hospital on November 4th, 1895. He could give no history of his sickness, being unable to speak English, but com-

[a] Laryngeal Necrosis in Typhoid Fever. Dublin Journal of Medical Science. Third Series. No. CCCXV., p. 185.

plained chiefly of a pain in the lower part of his abdomen. He also suffered from cough, and expectorated some thin, viscid sputum with ropy masses of mucus. The tongue was thickly coated; bronchitic râles all over the chest were the only abnormal sign. Later the motions were of a typical typhoid nature, and the spleen was found to be enlarged. The throat also looked very sore.

From this time on the fever, although somewhat severe, ran an uneventful course, the temperature almost touching normal in 21 days after admission, and probably the 25th day of his fever. Towards the end of the time, however, the patient became decidedly hoarse, and complained of laryngeal pain.

On the night of the 25th November, about the 24th day of the disease, the huskiness increased to almost aphonia, and the patient was attacked by spasm of the glottis and dyspnœa, which was temporarily relieved by hot applications. A consultation was held on his case on the following morning, and it was decided that tracheotomy was not then advisable, but that everything should be kept in readiness in case of necessity.

This necessity occurred on December 4th, when the dyspnœa was so great that my colleague, Dr. Taylor, decided to perform tracheotomy at once; indeed, so urgent were the symptoms that in spite of great haste the patient's breathing stopped while he was on the table, and artificial respiration had to be resorted to.

For two days the fever was very high, but dropped below normal on the third day. After this the patient had a good recovery from the fever, but the tube could not be permanently removed, attempts being made on several occasions, but without success, as the tube had generally to be replaced within a few hours.

On January 3rd, 1896, Dr. R. H. Woods examined the larynx and found a yellow ulcerating patch between the true and false vocal cords on the left side; and again on March 8th, when he advised dilatation of the larynx.

An attempt was made on March 11th to do this by Dr. Taylor, which was, however, unsuccessful, as the patient became almost asphyxiated in the attempt, and the use of the tracheotomy tube had to be continued. Another attempt was also made later on to cause the respiration to return to its normal path by gradually closing the opening, but also without success.

When the patient left the hospital to return to his own country, on July 9th, 1896, he was in excellent health, but still continued the use of the tracheotomy tube.

The principal points of scientific and clinical interest illustrated by the foregoing case are:—

1. The complication occurred in a young man, aged twenty, thereby conforming, as regards this ætiological factor, with the majority of published cases.

2. The pharynx and larynx as well as the mucous membrane of the bronchial tubes were inflamed from an early stage of the fever, as evidenced by cough and expectoration of ropy mucus; and when the bronchial catarrh subsided the laryngeal complication became more pronounced.

3. The laryngeal symptoms became urgent after the primary fever had abated.

4. Operative interference became suddenly imperative ten days later, suggesting, as a hint for future practice in similar cases, the advisableness of (*a*) having every arrangement made for immediate tracheotomy when the necessity should arise; or (*b*) having the tracheal tube inserted before the urgency arose, as soon as the symptoms and signs clearly demonstrate the presence of this grave complication.

5. The presence of an ulcer posteriorly between the vocal cords which ended in cicatricial stenosis.

6. The absolute nature of the closure, so that the tracheal tube could never be dispensed with afterwards, and the failure to use intubation or dilatation of the constricted larynx.

SOME REMARKS ON TYPHOID FEVER.

By HENRY C. DRURY, M.D., F.R.C.P.I.;
Assistant Physician, Sir Patrick Dun's Hospital;
Temporary Physician, Cork-street Fever Hospital.

[Read in the Section of Medicine, April 15, 1898.]

It sometimes seems to me that we seek too much for out-of-the-way cases and rare conditions for the subject-matter of our discussions here, whereas the material lying at hand to everyone might prove more useful, not only to the person who made a thoughtful study of it, but also to the more general body of practitioners and patients. Consequently, though it may be said of typhoid fever as of other things, "There is nothing new under the sun," still it will be admitted there are many things to learn. Since the publication of Murchison's magnificent monograph on the continued fevers in 1862, little really new, and at the same time helpful, has been added to our knowledge of the subject, with the exception of the isolation of Eberth's bacillus in 1880.

"Widal's reaction," as a means of certain and scientific diagnosis, promised an important advance to our knowledge. The promise may yet be fulfilled, but it would be premature to say that it has been. No sufficiently exhaustive investigation, extending over a large number of cases of different diseases, and checked by autopsy—that wrecker of diagnoses—has yet been applied to the subject.

The most important communication on this question that I am aware of is that of Drs. Colville and Donnan, of Belfast, published in the *Brit. Med. Journal*, Oct. 16, 1897. They tabulate the results of the examination of 132 cases, by Widal's serum test for typhoid fever. The results are

encouraging as far as they go, but the number is far too small from which to draw important and far-reaching conclusions. The cases which clinically ran a typhoid course numbered 105; of these 84 gave a complete reaction, 19 an incomplete reaction, and 2 no reaction at all. Only 27 clinically doubtful cases were tested, and of these only one gave the reaction, and it was a case of typhoid fever. In only one case was an autopsy performed, and it proved to be a case of general tuberculosis, but had not reacted to the test.

To make such an investigation of real use a much larger proportion of clinically doubtful cases should be examined. Let us suppose only four classes of cases to be examined—viz., typhoid fever itself, meningitis, tuberculosis, and ill-defined or simple fever. If the above 132 examinations were divided amongst these four it would only allow 33 for each—a number which, it will be allowed, is much too small, though the total of 132 represents no mean amount of time, work, and trouble.

Again, it is necessary that a large number of *post-mortem* examinations should be made of cases of all kinds that have been subjected to the test reaction. For this it would be necessary to make an autopsy in *every* case of death, and unfortunately our power to do this is so hampered by prejudice against such a real means of increasing our knowledge, that I fear it must be left to some less free country than ours to carry out the investigation.

Drs. Colville and Donnan say, "Surely a method which has proved in this instance to be correct in over 98 per cent. of cases, must undoubtedly have a very solid foundation." I say it is that very 2 per cent. we are anxious about. With dogged Northern perseverance, which we all admire, the splendid buildings of Belfast have been reared on 30-foot piles driven into the mud. Would those

foundations be described as "very solid" if 2 per cent. of the piles were omitted—especially if it was at the corners that the omission occurred? It is the "corners" we want to be sure about in our diagnoses. Practising physicians, to make use of the test, will only want it in doubtful cases, and after it is made it will not do to ask ourselves, "Is this one of the 2 per cent.?"

I do not wish to disparage in the least what has been done, what I would be proud to have done myself, but I can consider it only a step. Unless an enthusiast, independent of his profession, turns up we can do little under present circumstances. Consider what would be required. It would be necessary, in order to get sufficient cases, that he should have the run of every hospital in Dublin, and therefore the co-operation of every physician connected therewith; that every tested case which died should have the cause of death verified by *post-mortem* examination; and, in addition to all this, a well-equipped laboratory and unlimited time at his disposal.

In the *British Medical Journal Epitomé*, Nov. 13, 1897, there is notice of an important article by Widal and Sicard reviewing the state of our knowledge on this subject, and their own conclusions based on the study of 163 cases. The conclusions are, on the whole, good.

The latest novelty has been in the line of treatment, as it not infrequently is. But in this instance the novelty opens up a wide field for research and experiment which may carry us many steps in advance of anything before. I refer to the antitoxin or serum treatment. It may be that here we have touched the penumbra of that shadow which will eclipse all other forms of treatment, not only in this but in many other varieties of disease. I believe we have not only touched it, but have already entered it. As yet, however, it is too hazy to make any calculations

from it; but I believe we are on the eve of such discoveries in the treatment of specific diseases as will do much to remove the stigma that rests upon our profession—that in most cases our function is to watch the uncontrolled course of disease, endeavour to prevent complications, and treat them when they arise. Though this change will not come upon us with the swift surprise that Listerism came upon the surgical world, it will be looked back to by future generations as an epoch in medicine, just as Lister's enunciations mark an epoch in surgery. All honour to the great crowd of workers in this grand field of research, but in the number of men, the number of names applied to the method, and the number of years it is taking to thoroughly unravel the intricacies of the subject, it seems to me the tendency is to forget the master mind who first conceived that the tangled skein had an end, and quietly and diligently sought for it until he found it, hidden though it was in ignorance, prejudice, and doubt. As Prof. Richet said at the last meeting of the British Medical Association, serum therapeutics are "a direct consequence of the labours of Pasteur."[a] What more suitable title for the method that he inaugurated could be applied to it than one derived from that great name?

As yet the serum treatment of typhoid fever has been but little tested. That universal provider for all bountiful prescribers, the firm of Burroughs, Wellcome & Co., has, with praiseworthy business promptitude, supplied an anti-typhoid serum. Of course we know nothing about its mode of preparation. Some seven cases have been reported in the *British Medical Journal*[b] up to the end of 1897, in which anti-typhoid serum was used; that supplied by the above-

[a] British Medical Journal, Sept. 18, 1897.

[b] British Medical Journal.—Jan. 30, 1897, p. 259, 4 cases, Dr. Pope; Feb. 27, 1897, p. 518, 1 case, Dr. Cooper; April 17, 1897, p. 970, 1 case, Dr. Steele; July 10, 1897, p. 81, 1 case, Dr. Howlett.

named firm was the preparation used in all. In all the cases there appeared to be marked improvement, and finally, recovery after its use.

If this line of treatment should, in the future, yield such results as to demand its universal practice, it will be another bright jewel in the diadem of science.

Science cannot stand still, and amongst her workers our countryman, Prof. A. R. Wright, is working hard at the setting for another and brighter jewel, since prevention is better than cure.

In the *Lancet* of Sept. 19, 1896, he described in detail a method for the preparation of a substance for vaccination against typhoid fever. He was the first to introduce it and the first to practise it.[a] He has been working at it earnestly since, and quite lately vaccinated a batch of men at Netley who were going to India,[b] where typhoid fever is rife and where it claims a fatal power over the larger number of its European victims.

These are the newer lines in which science is now leading us. We, as practising physicians, must wait till the tools are fashioned to our hands by the workers in the laboratory. There is no reason, however, why we should not endeavour to help, and it seems to me that those who hold important positions in our public hospitals might, without any great outlay of time or money, help greatly by systematically experimenting, observing, tabulating, and then reporting results.

Thinking back on the older methods, there are very many subjects, any one of which might be made the subject-matter of an instructive discussion here. I will refer in the most general manner to two or three, avoiding particulars as far as possible.

[a] Vide British Medical Journal, Jan. 30, 1897.
[b] British Medical Journal, Oct. 9, 1897.

It often happens that when certain lines of treatment are introduced or advocated by leading men, these lines are taken up by all or sundry as hobbies, and ridden to death. Thus with the depressant treatment of old; it went to such extremes that doubtless many were bled, starved, or depressed to death. Naturally with the introduction of the nutritive and stimulant treatment, the pendulum swung off to the opposite extreme, and many victims gave up the struggle for life, gorged or intoxicated. Then the stand-off treatment "took on," and men thought with awe of the ulcerated bowel seen at the last pathological gathering. They looked upon the mildest purgative as the deadliest poison.

Then master minds pointed out the value of removing undigested and putrefying material from the bowel by a dose of calomel. This was found harmless, so "Eureka!" calomel became the fashion, and was to disinfect the whole gastro-intestinal tract, and so cure typhoid like a charm. Thus the hobby romped as before.

Every one of these began well, contained germs of truth and good treatment, but when taken up by unthinking minds became mere hobbies, and so their grotesqueness laughed them out of court—carrying the good with them.

For example—the pendulum has swung back again to-day with many, and they dread, and so avoid anything in the nature of a purgative in typhoid fever. Murchison was not so timid. He says:—"It does not follow, however, that no interference is justifiable when the bowels are constipated. When there is constipation at the commencement of the attack it is well to commence the treatment by a small dose of castor oil, or of rhubarb in peppermint water. When the bowels are confined at a later stage I am in the habit of prescribing every second or third day one or two teaspoonfuls of castor oil, or a simple enema."

This I believe to be sound practice, though not common

practice. It is, however, followed out at Cork-street Hospital at the present time. There, unless the evacuations are moderate in amount, and of normal typhoid appearance, the patient is given the day after admission 1 or 2 drachms of castor oil, or 2 grs. of calomel. Either in this small dose acts quietly, but efficiently; the dejecta are further examined, and if solid matter or undigested curd, &c., are still passed the dose is repeated. Constipation also is treated in a similar manner, allowing only one day to elapse without a motion. Thus, at any stage of the disease 3i. of castor oil, or 2 grs. of calomel are given if indicated, without fearing any ill effect whatever, whether of hæmorrhage, perforation, or diarrhœa. There is no routine in this, judgment is used in each case, and in each act of prescribing. It is routine that kills many a good practice.

Another important consideration is—the time to commence solid food. I know from experience that very various ideas are held on this subject, indeed some people seem to have no ideas on it at all, or at least follow no rule or course of practice in connection with it. Murchison is very vague on the question. He says, "Diet must be at first restricted to such articles as milk, eggs, farinacea, custards, light puddings, beef-tea, chicken tea, calves'-foot jelly. Meat must not be allowed for at least seven days after the cessation of pyrexia." Therefore, sometime within the first seven days of apyrexia he allowed eggs and farinacea.

In Cork-street, where there is a great field for observation, and where the experience of years has been condensed, the patients are given a very small quantity of solid food—viz., bread-crumb or plain arrowroot biscuit about the third or fourth day of apyrexia. The temperature is carefully watched, and if there is any rise that evening, or the

next morning, the food is discontinued, and a dose of oil or calomel is given immediately. In nine cases out of ten the temperature falls that evening or the following morning, and after two or three more days food is again given without bad result. It is very seldom that a rise of temperature occurs after food given on the third or fourth day. As a general rule the amount of solids given is gradually increased daily. Anything of the nature of a true relapse is extremely rare. I really believe this to be due to the prompt clearing out of the bowel on the first appearance of a rise of temperature. I may be criticised for appearing to lay so much stress on a rise of temperature. Of the number of degrees it rises I pay but little heed; I look on it only as an indication—the earliest and most delicate, I believe—that something is wrong, and we must be "on guard."

On one occasion a patient who had very severe illness was surreptitiously given by another patient a large slice of bread and butter. That night the temperature ran up to 104°; in the morning the culprit confessed. A dose of oil was given, repeated each morning, and by the third or fourth day the temperature was normal, and remained so. I could multiply such cases. We cannot lay down hard and fast rules on this subject. I have seen food given on the second day of apyrexia without bad effect, and again hvae seen a regular relapse follow the first ingestion of solid food on the seventh day. Indeed, who has not seen a relapse where solid food had not been taken at all?

In private practice I think it better to be on the safer side, and leave the larger interval between fever and food. Here everything is so anxiously watched and discussed by over-anxious friends that any elevation of temperature or stopping of food once given creates such a scare that great harm is done and great blame incurred. But in

hospital practice we have a freer hand—time is precious; the difference between three and seven or ten days abstinence from solid food is a great one for the yearning patient, and is great too in speeding or retarding the restoration of strength; the bed is needed for another patient; the patient is sorely needed back to his or her family—and every day we can gain is thus important. I can well understand diversity of opinion on this point. I lay down no law, I advise no routine short cut to convalescence; but I say we must be guided by circumstances and by individuals. I have heard years ago the hard and fast rule laid down, "Never give solid food till the tenth day of apyrexia." In some cases this may be necessary, but in many cases it would amount to unnecessary cruelty.

The last subject to which I will refer is the somewhat strange one of the use of the bed-pan. It seems to be almost an article of faith that as soon as a patient is pronounced in typhoid fever he must use a bed-pan for the rest of his illness. All Murchison says about it is this, he refers you back to typhus fever, and there says—"After the first week in severe cases they ought to be provided with a bed-pan, and on no account to get out of bed." This comes into a section commencing—"Steps must be taken to prevent the patient exhausting his muscular and nervous power." I presume, therefore, that is the object of the bed-pan in typhus, but he makes no mention of it in enteric, therefore it is not clear whether he recommended its use to preserve muscular and nervous power, or to guard against the danger of perforation or hæmorrhage—probably he had all these objects in view.

There is no doubt that to many people the use of the bed-pan is exceedingly irksome. I believe that to nearly everyone it is so at first. Some find the greatest difficulty in making use of it, and except in the case of "needs must"

cannot or will not do so. I remember one doctor that I attended who, though he had not enteric, had diarrhœa and such extreme weakness that we feared his sitting up. We tried by every art and persuasion to get him to use the bed-pan; he did try a few times, but, after that, persuasion was useless; he would always get out of bed to the night-chair as long as he had strength to do so.

A doctor who was ill with fever in Cork-street Hospital had a similar experience, and so hated and dreaded the trials he made to use the bed-pan that he raved about it when he became delirious, and always insisted on getting up to the night-chair.

It will surprise many here to learn that the bed-pan is seldom used, even in typhoid fever, in Cork-street Hospital. There is a night-chair beside every bed, and as long as the patient is able to get up to this he is allowed to do so. The nurse gives him assistance and covers him up. Only when unable to get out of bed is the bed-pan used; then it is found in many cases to be unnecessary, as by that time the patient generally passes all evacuations unconsciously.

The arguments in favour of the unusual practice are:—

1. Less annoyance to the patient.

2. More complete evacuation of the bowel, and therefore less frequent disturbance.

3. The more natural position causes less straining, and therefore really less risk of either hæmorrhage or perforation.

A weak patient cannot fall off the chair on account of the strong high arms, which give him comfortable support while he sits.

It will, of course, be objected that this is a ready way of courting disaster, either by hæmorrhage, perforation, or syncope. I can only say that we do not find it to be so.

I have looked up the bed cards of all cases admitted during a period of five months. During that time 92 cases were

treated, 9 of whom died. Of the 83 that recovered not one had either hæmorrhage or perforation. Of those who died:—

No. I. was ill 20 days before admission; had hæmorrhage the day after admission; died 15 days after.

No. II. was ill 8 days before admission; developed double pneumonia; died 9 days after admission.

No. III. ill 14 days before admission; died within 26 hours with double pneumonia.

No. IV. ill 9 days before admission; died 10 days after, due to general severity of disease without special complication.

No. V. ill 8 days before admission; died 4 weeks after; had constant high temperature with pulmonary complications.

No. VI. ill 7 days before admission; died 3 weeks after; had very high temperature, insomnia, pulmonary complications, gradual cardiac failure.

No. VII. six days ill, at least, before admission; died 10 days after from pulmonary complications and gradual cardiac failure.

No. VIII. one month ill before admission; died 6 days after from gradual cardiac failure.

No. IX. ten days ill before admission; died 11 days after, having profuse diarrhœa and pulmonary complications.

I would apologise for giving the particulars of only five months' cases. They were consecutive months, not specially selected. As I had to search through all the bed cards for these particulars, and as the daily average number of cases in the house was about 180, it was no small labour going through all the cards of five months, it being remembered also that Cork-street is not a very convenient place to get at for a spare hour. I hope, therefore, that you will accept the examination of these 92 cases as bearing out what I say—that

hæmorrhage, perforation, and syncope are very rare complications with us.

In further support of the general treatment of typhoid at Cork-street Hospital I would mention that at the London Fever Hospital from 1848–1870 the mortality was 17·26 per cent. From 1871 to 1882, after the exclusion of pauper patients, the death-rate was 15·9 per cent.; at Cork-street Hospital, from 1871 to 1890, the death-rate was 8·6 per cent., only half the mortality of the London Fever Hospital.[a]

In 1894	-	260 admitted with	20	deaths.
„ 1895	-	105 „	9	„
„ 1896	-	106 „	8	„
„ 1897	-	260 „	29	„

So that the mortality with us still remains low.

There is no wish to dogmatise as to the best methods or results, but simply the desire to have them discussed by those with more wisdom and greater experience. I claim nothing in the least original in the foregoing remarks; they give simply the result of experience gained by observation of the methods and results of an institution with a very honourable record; but I would pay a tribute to the real head of that institution, Dr. J. Marshall Day, the Resident Physician, who makes that record honourable. Nor have his fourteen years of service begotten one suspicion of routine to dull the edge of his zeal, observation, industry and care, which have made Cork-street Hospital a favourite resort of our Dublin poor in their bitter hour of sickness.

Dr. Littledale had some experience with the Widal reaction, having tested 51 cases of fever more or less in routine in Sir P. Dun's Hospital. A case was sent in as scarlatina, without any rash, but with sore throat; Widal reaction absolute, all the bacilli immediately going into clumps. He used nine drops of serum and

[a] Dr. J. W. Moore. Eruptive and Continued Fevers.

one of blood. In another case the diagnosis between typhoid and acute tuberculosis had to be made. Widal test showed some clumping and faint diminution of motion; but even after 20 hours there was plenty of movement across the field. He gave another case where, on the seventh day of illness, the temperature dropped from 103° to 97°, where it remained. There were absolutely no signs of pneumonia; but the case gave the diazo reaction, and a doubtful sort of Widal. With the Widal reaction there were two kinds of motion—molecular motion, which occurs in most typhoid cases for half an hour, and true motion, which, as a rule, is not seen in typhoid cases. As regards clumping, in cases of typhoid after a clump is formed a bacillus will never leave a clump, whereas in other non-typhoid cases two or three bacilli will leave the clump and go across the field. He thought that the Widal reaction sometimes left one in doubt. In ordinary cases he was disposed to think that they diluted too much.

Dr. Burgess agreed with Dr. Drury regarding the treatment of typhoid fever with purgatives. He had tried purgatives for many years, and never found any bad results. Cases of constipation, with moderate fever, he treated with purgatives, which he thought was better treatment than administering enemas of soap and water.

Dr. J. W. Moore drew attention to the great frequency of constipation in typhoid fever. Constipation was sometimes the most troublesome thing to treat in typhoid. He agreed entirely with the treatment by purgatives. He thought it good, particularly in children, to add a teaspoonful of glycerine to one of castor oil in a small wineglassful of milk. By so doing, one combined a certain amount of nourishment, and he was satisfied that the glycerine had a certain antiseptic effect but no aperient effect. Calomel was the best aperient in the earlier stages, from two to five grains in the first week of the fever.

Dr. N. Falkiner asked the speakers to state their views on the administration of purgatives in all the stages of the fever, and what purgatives would they use. Dr. Gordon long ago taught that the safest purgative was solution of magnesia of the Pharmacopœia, which was exceedingly mild.

Dr. Knott said that cases which he had seen of typhoid with constipation certainly presented a great deal more stupor and approximation to typhus.

Dr. Finny said if the course of the disease is allowed to run itself, the tendency is towards improvement and recovery; and

he thought it was over-care and over-treatment that was so harmful.

Dr. W. G. Smith said that, speaking generally, in typhoid fever the less interference the better. Matters calling for interference were diet, bowels, and nervous symptoms. He was not in favour of early resort to solid diet soon after apyrexia is established. Dietetics of a typhoid patient ought to be managed on the same general physiological principles that diet is given on. A typhoid patient required a proper proportion not only of proteids, but also of carbohydrates and fats. Carbohydrates could easily be added. Cream, as a rule, was well borne by typhoid patients. He remarked that fish was not the innocuous thing it was generally supposed to be, as it seemed to act as an irritant, and was, he thought, more dangerous than a tender mutton chop. The question of the bed-pan was one of common sense. He was in favour of aperients in constipation, as the latter tended to precipitate perforation. He gave castor oil and calomel by the mouth, and enemata when necessary. With regard to the action of calomel, he thought it probable that it made some sort of an albuminous compound with the gastro-intestinal contents of the intestine.

Dr. Drury, in reply, said that Dr. Finny must have misunderstood him, as it was his (Dr. Drury's) wish to say that the discretion of the doctor should be used in certain directions. He distinctly said that there was no routine in the giving of any purgative or treatment, that it was routine that killed, that he did not treat typhoid fever by purgatives, but that he preferred typhoid fever to work out its own ends, and only treat symptoms if necessary. With regard to the use of the bed-chair, it was merely to show that certain things could be done which he knew a good many men feared to do.

A CASE OF SLOW CARDIAC ACTION.

By R. J. KINKEAD, M.D., Galway.

[Read in the Section of Medicine, May 20.]

On the morning of March 16th, 1898, I was called to see Mr. C.

I found him in bed. He gave the following history:—Had always enjoyed good health; a capital appetite; digestion satisfactory; "could eat anything"; bowels regular; slept well. He had been perfectly well until evening of the 15th, when just at supper time he "felt faint"; it passed off rapidly, and he eat his supper, although while doing so the faint feeling recurred. After supper he went out, "thinking the air would do him good;" while out he had a sharper attack of faintness than the preceding ones: came in and went to bed, but did not sleep, the attacks of faintness recurring at short intervals during the night.

He did not look ill; his temperature 98°; pulse regular, soft, and irritable; tongue slightly coated; respiration normal; abdomen soft; slight tenderness over area of stomach; no vomiting, but nausea on pressure; heart sounds rather short and irritable; valves healthy; respiratory sounds normal. On lying down after I had examined the back of his chest he exclaimed, "that faintness is coming on again." On placing my finger on pulse I found it intermitting—three beats and then a stop for ten seconds: the stethoscope showed correspondence between heart and pulse—three beats, then absolute silence for ten seconds.

I saw him again in the evening. During the day the attacks of faintness had become more frequent, and for some hours the faint feeling had been continuous: he had not lost consciousness at any time, and his mind had been, and was, perfectly clear; he had vomited two or three times, and there was now acute pain on pressure just below the ensiform cartilage.

The pulse had fallen to 6 in the minute. There was one beat of the heart—first and second sound distinct and a hæmic murmur with the first—then neither impulse nor sound for ten seconds; then another beat and ten seconds interval, and so on; he complained of a "rushing, surging feeling" in his head immediately after each contraction.

I watched him for fully an hour, phonendoscope over cardiac area, finger on pulse, and timing interval by my watch, and during that hour the heart beat exactly six times in each minute.

Professor Pye kindly gave me the benefit of his advice in consultation. We injected atropin hypodermically, and applied a mustard leaf to pit of stomach.

About an hour after faint feeling passed off, the pain at pit of stomach got better, and he passed a comfortable night.

Next morning I found pulse beating 72 to the minute, and heart's action regular and normal, stomach tenderness gone. He progressed favourably until the 25th, when the pulse began to intermit, missing one beat in every ten or twelve; and during the night of 25th both knees became intensely painful and swelled.

I put him on salicylate of sodium; the pain subsided, the swelling went down, pulse became regular, and on 27th he was apparently well. He got up in a day or two, and since then he has had no recurrence of pain, faintness, or indigestion.

Exactly how long the heart beat at the phenomenal rate

of 6 to the minute it is impossible to say—probably for six or seven hours from the time the faint feeling became continuous, and there was the "surging and rushing in the head." Prior to that it had, with short intervals, been contracting at the rate of 14 or 15 to the minute.

The entire period covered by the irregular action from the first feeling of faintness was fully twenty-eight hours.

A CASE OF MEMBRANOUS COLITIS.

By W. R. DAWSON, M.D.,
Farnham House Asylum, Finglas.

[Read in the Section of Medicine, May 20, 1898.]

THE comparative rarity of the condition variously described under the above and a host of other names seems to justify me in bringing the following case under your notice:—

CASE.—A medical man, about forty-two years of age, apparently in excellent health, mentioned to me last Autumn that he had been habitually passing from the bowel a quantity of membranous-looking material. His history relative to this condition is as follows, and for many of the facts I am indebted to his kindness in furnishing me with notes of his case:—

He had formerly been addicted to the use of cocaine, and when under the influence of the drug had observed that his stools were paler than normal, but there has never been any jaundice, and until about three years ago no habitual constipation. Since then, however, the latter condition has been persistent, and indeed is so bad that for about two and a half years the bowels have rarely moved normally. At the same time there have been no constant dyspeptic troubles, though some malaise and loss of appetite at times. At first, when two or three days were allowed to intervene between the motions, and also on a few occasions when a fœtid diarrhœa occurred, there were more or less severe colicky pains before and during the passage of fæces, but this symptom has since been conspicuous by its absence. Somewhere under two years ago, imagining that the symptoms might be due to tænia, he had himself treated in the usual way for that condition, but apparently without result. About the same period he observed that enemata and aperients brought away with the fæces smooth rounded or oval masses, light brown or white in colour, and apparently consisting of undigested food, while the evacuations were followed by a discharge of mucus. White shreds and patches of membranous structure then began to come away, and the phenomena were accompanied with intestinal flatulence, and eructations of gas. These symptoms have persisted in varying degree ever since, but are

remittent, being almost in abeyance for two or three months at a time, when an exacerbation occurs and lasts a week or two. At these times the first symptom now is the discharge of a number of particles of undigested food, followed later by the appearance or increase of the membranes, the bulk of which follows the fæces. There is at the same time an unusual sleepiness and lassitude, with incapacity for mental rather than physical exertion. Eructations of gas from the stomach, especially just on waking, and sudden transient attacks of nausea at meals, are also present.

In the beginning of January, 1897, the patient showed me a white structure several inches in length, which he had brought up (by eructation rather than actual vomiting) in the night. Neither of us doubted that it was a piece of tænia at the time, and, though subsequent events may make one hesitate, I mention the fact for what it is worth. He was submitted two or three times to treatment with oil of male-fern, turpentine, &c., and seemed to be decidedly better afterwards, though no proglottides were found.

From the time when the membranous colitis was diagnosed and came under more special observation it has never been entirely absent, though sometimes only manifested by mucus, and the exacerbations above alluded to have occasionally occurred, and are of the general character described. Thus there was a rather severe one about Christmas, and another, less severe, in the beginning of April. Their cause is undetermined. Diet in the patient's opinion, has no relation to them,[a] but saline aperients (not other aperients) at once increase the discharge of membranes, which has also been found to be increased during catarrhal inflammation of other mucous membranes, such as coryza. A certain uncomfortable sensation, with borborygmi and eructation of gas, which can always be excited by pressure over the lower ribs in the region of the posterior axillary line, becomes distinctly worse during the exacerbations, but there is no actual pain, nor is there abdominal tenderness elsewhere at any time. No blood has ever been passed with the stools, except a trace from piles. The urine has never shown any abnormality, nor is any cardiac trouble complained of at such times. The tongue is habitually covered with thick brown fur in the posterior third, clean in front. The liver is very slightly

[a] There has been reason to modify this opinion.

enlarged. Constipation still persists, and is treated with enemata of warm water or glycerine, which do not cause increase in the membranes—in fact since the latter began to be used, about four months ago, the condition seems to have improved. Assimilation and general nutrition have not been at all affected, and in fact the patient is in all other respects about the healthiest man of my acquaintance.

A few words must be said as to the membranes discharged. At the beginning of an attack they are small, and come with the fæces, later larger, and follow the latter in a mass which may almost equal them in amount, being in bulk as much as, say, a small tumblerful at times. They vary in size from small pieces and shreds to bands from six inches to a foot in length, and about half to one inch in width. No complete tubes have been observed. The typical structure consists of a band of firm fibrous-looking material, sometimes laminated and showing secondary ridges, from the edges of which a delicate film of mucus projects for a varying distance. The central band is stained of a brown colour. Sometimes the strands are twisted, and entangle particles of fæces, sometimes flattened like portions of tænia. It appears to consist entirely of mucus, as the whole membrane coagulates with acetic acid. Under the microscope the mucous matrix is found to contain embedded in it a very large number of more or less degenerated cells, mostly derived from the cylindrical epithelium of the gut, but also round cells, some of which are probably leucocytes, and nuclei either free or surrounded by a very scanty amount of protoplasm. Most of the cells are in an advanced stage of fatty degeneration, and there is a good deal of fatty debris.[a]

[a] Since this paper was read, one or two sections, cut from portions of membrane embedded in celloidin, have been stained by Weigert's method, with a view to gaining information as to the presence or absence of fibrin, but with unsatisfactory results, as mucus also retains the dye. It may, however, be safely concluded that if any fibrin at all be present, it is only in very small quantity. As might be expected, these preparations show great masses of bacteria embedded in the membranes.

The points to which special attention may be called in this case are—first, the sex of the patient, the condition being commonest in hysterical women; secondly, its persistence; thirdly, the absence of any mental depression whatever; fourthly, the excellent state of the patient's nutrition; fifthly, the absence of pain; and, sixthly, the mode of discharge of the membranes, which, as has been said, came after the fæces instead of preceding as is usually the case. The absence of colic may be partly due to the care taken to secure a daily evacuation, but it also goes with the splendid general health and the comparatively small amount of membranes passed to indicate that the affected area of the intestine can be of no great extent, nor the lesion of any great severity. Relying on the localised pressure symptom alluded to above, I am inclined to think that there is a patch of chronic catarrhal inflammation in the region of the hepatic flexure, probably started by constipation in the first instance. What is the cause of the slight enlargement of the liver it is difficult to say, but it is of some standing, and appears to produce no results whatever.

The pathology of this unusual condition seems to be very imperfectly understood, but the abundant desquamation of epithelial cells, in addition to the mucus, and the presence of fibrin in some instances, which is vouched for by von Jaksch[a] and others,[b] Hale White[c] to the contrary notwithstanding, seem to indicate a varying degree of inflammation, though why it should take this form it is difficult to say. There is reason to think that the membranes are commonly passed soon after they are formed (Hale White),[d] and Birch-Hirschfeld[e] considers that they develop in the folds of the large intestine when it is contracted, so that the dilatation

[a] *Clinical Diagnosis*, trans. Cagney. 4th Ed.
[b] E. M. Light; Desquamative Enteritis." *Practitioner*, Vol. L., p. 173.
[c] Allbutt's *System of Medicine*, Vol. III., p. 944.
[d] *Loc. cit.*
[e] *Lehrb. d. path. Anat.*, Vol. II., p. 669.

of the gut sets them free. Probably the conditions are not in all cases the same.

As regards treament, it does not seem possible to influence the condition except by general means and by relieving the constipation. For the latter purpose enemata, and especially glycerine injections of about a couple of drachms, have been found most satisfactory, and there is, on the whole, some improvement. The lesion is of the nature rather of a slight annoyance rather than a serious malady, and hence does not appear to demand any more energetic interference.

Dr. Wallace Beatty had met with a somewhat similar case. Patient was a policeman, in good health, except that he was continually passing large quantities of membranous material from the bowels, associated with very obstinate constipation. Patient was twenty-seven years of age, and had been under observation for many years. All kinds of remedies were tried without benefit. He was then placed on milk diet and cod-liver oil, and he still continues the diet, and is doing very well and able to continue his work, and passes very little membrane. Such cases, he thought, were very intractable, and prolonged unirritating diet was the best treatment.

The President thought that in Dr. Dawson's case the shreds of membrane consisted of mucin, and so, perhaps, mucous-colitis would be a better name, as it contained no fibrin. The pathology of this condition would appear to be a follicular catarrh of portion of the mucous membrane of the intestine. It was difficult to know the cause. It may have been connected with the habitual constipation. Some considered the disease a neurosis; some observers think that the best treatment is to look after the hygienic condition of the patient. Very large enemata were useful; perhaps a quart or more of water, with 15 to 20 minims of dilute nitric acid, and this quantity of acid increased. Did Dr. Dawson try that? Did he find the glycerine enemata more efficacious than plain aqueous enemata?

Dr. Doyle related the case of a man who, when he saw him first, complained of a very viscid condition of the fæcal matter and a quantity of mucous shreds which he passed. Patient had been

subject to great mental worry; he suffered much from constipation. Examination showed the fæcal matter to accumulate in the sigmoid flexure. Death occurred in a year. *Post-mortem* showed a non-malignant hard band causing a stricture. The proximal end of the gut, just above the stricture, had given way, and below the stricture there was scarcely any inflammatory condition, while all above there was an inflammation of the colon. Enemata had been found very useful in this case. He related another case, that of a girl, who came under his observation six weeks ago. There was a stricture high up in the rectum close to the sigmoid flexure. Mucus was continually being passed per anum. There were large accumulations in the cæcum and sigmoid flexure. At first he could not pass his finger through the stricture, but could do so now. The collections of fæces have now disappeared, and patient has a good evacuation of the bowels.

Dr. Dawson, in reply, said he was much interested in Dr. Beatty's case especially regarding the milk diet. In his own case diet seemed to have no relation at all, as the patient rather watched his diet, and took some things experimentally, and found plum pudding quite innocuous. Regarding the name of the disease, he thought that no satisfactory name had yet been fixed, but, as a matter of fact, a certain number of cases have been described in which there was a very large amount of fibrin in the membranes, although the case did not differ much otherwise, so that the objection to the term membranous would not hold in all cases. The connection of the disease with the nervous system was very interesting, as it did occur in nervous people. His own patient was rather a typical subject. Acid enemata had not been tried, but the ordinary warm water is used alternately with the glycerine enemata, and the latter work best when they act at all. Dr. Doyle's case showed the power of accumulation of fæces to produce this condition.

DISSECTING ANEURYSM.

By JAMES B. COLEMAN, M.D. R.U.I.; M.R.C.P.I.;
Physician to the Richmond, Whitworth, and Hardwicke Hospitals;
Physician to the National Hospital for Consumption for Ireland.

[Read in the Section of Medicine, May 20, 1898.]

THE term "dissecting aneurysm" is applied to cases in which a partial rupture of the inner tunics of an artery allows the blood to become diffused between the coats of the vessel. Having regard to the difference of opinion which exists as to the author of the original description of this very remarkable affection, the following extract from Dr. Peacock's "Report on Cases of Dissecting Aneurysm"[1] may be of interest:—"It has generally been supposed that Laennec was the first writer who applied the term 'dissecting' to this form of aneurysm, but it has been recently shown by M. Broca that M. Maunoir employed the same designation, and clearly described the formation of aneurysms of this kind in his work published in 1802. A characteristic case is also related by Mr. Allan Burns in his work on 'Diseases of the Heart and Aneurysm,' published in 1809."

Shekelton[2] published two cases of dissecting aneurysm in 1822, and the preparations are to be seen in the Museum of the Royal College of Surgeons in Ireland. Erichsen, in the earlier editions of his "Science and Art of Surgery," incorrectly refers to this variety of aneurysm as "originally described by Shekelton," and the use of the name "Shekelton's aneurysm" as a synonym for dissecting aneurysm is not justifiable.

Dr. Peacock, in the paper to which I have already referred, collected 80 instances in which the affection appeared in well-marked form, including five cases published by Shekelton,[2] R. W. Smith,[3] Kirkpatrick,[4] Lees,[5] and MacDonnell,[6] respec-

tively, in the *Dublin Journal.* An interesting specimen was exhibited by Mr. Conolly Norman at the Pathological Section of the Academy a few months ago.*

In the earlier published cases of dissecting aneurysm it was supposed that the separation of the coats of the artery took place between the middle and external tunic; but modern pathologists agree that the blood almost invariably makes its way between the laminæ of the middle coat, so that the outer wall of the aneurysm is formed of the outer strata of the tunica media together with the adventitia.

In the vast majority of cases the rupture of the inner tunics is due to their excessive lacerability—the result of atheromatous degeneration. Indeed, out of 60 of Peacock's cases the arteries were found healthy in only two instances. Ziegler[7] suggests that in the rare absence of morbid changes in the coats of the vessels, traumatic injury to, or defective development of, the vessel wall is the primary cause of the lesion, and Walshe[8] mentions two cases in which dissection of the aortic coats on a limited scale had been abruptly effected as the result of railway concussion. On the other hand Rokitansky[9] supposes that in some cases a morbid condition of the external coat deprives the inner coats of support, and so predisposes to their rupture.

Dissecting aneurysm is practically confined to the aorta and its large branches, although Ziegler[7] states—on what authority I do not know—that the small arteries of the brain are a usual seat of the affection.

The internal rupture is usually situated at the origin of the aorta, or in the ascending aorta—it was so in 55 out of 73 of Peacock's cases—but it has been found as low as the end of the abdominal aorta, as happened in Shekelton's cases. The direction of the internal rupture is generally

* A valuable paper on Dissecting Aneurysm was published by Dr. J. Magee Finny in Trans. Acad. Med. Vol. III. 1885.

transverse when it is near the aortic valves, whilst it is more frequently vertical at the beginning of the descending aorta.

Ordinarily the arterial coats are torn asunder over from one-half to two-thirds of the circumference of the aorta, although the separation of the tunics occasionally extends completely around the vessel. The longitudinal extent of the separation of the tunics varies considerably; as a rule the aneurysm is limited to the ascending aorta, but it is occasionally found to extend beyond the iliac arteries. In my case the separation of the coats begins at the arch and ends in the left femoral, and in a very remarkable case recorded by Tessier [10] the separation extended from the commencement of the ascending aorta to the left popliteal artery.

The dissection not infrequently is carried along the primary branches of the aorta; for instance, in MacDonnell's and Tessier's cases it extended through the innominate artery and its branches to the internal carotid; in another case [11] it followed the course of the coronary arteries; in Laennec's case [12] it passed along the cœliac artery, and in my case into the right renal artery.

Some of the intercostal and lumbar arteries are frequently found to be cut across by the stream of blood, "so that a probe introduced into the aortic orifice of one of those little branches passes directly into the aneurysmal canal, and traverses this before entering the artery itself, which thus appears to arise directly from the aneurysm." [13]

In cases which have ended fatally within a short time, there has been only a single opening leading from the aorta into the arterial coats, death having been usually due to the subsequent giving way of the external wall of the sac. This is the common form, comprising 73 out of Peacock's 80 cases; my case is also an instance of it. On the other hand, when life is prolonged for any considerable

time, the blood is found to have forced its way from the sub-adventitious sac back again to the blood-stream at some point farther on in the course of the vessel. In such chronic cases—of which Shekelton's and Fagge's cases were examples, the new blood-channel acquires an endothelial lining.

The disease is specially common in persons of advanced age, and though it probably occurs more frequently in men than in women, there is not the excessive preponderance in males which is the rule in ordinary aneurysms. Indeed some writers say that it is more common in women.

The case which I now relate, and the specimen which I exhibit, typically exemplify the symptoms and pathology of the early stage of the fully-formed dissecting aneurysm.

Case.—A man, aged sixty-five years, was admitted to the Whitworth Hospital under my care on 13th Jan., 1898, complaining of severe pain in his back and of loss of power in his legs. On the morning of his admission to hospital he was on a ladder engaged in papering a room when he was suddenly seized with a violent pain in the lower part of his back and in his left hip. The pain appeared to start from his lumbar region and to shoot up into his chest and down to his left thigh. It was so intense that (to use his own expression) he "bellowed with agony." He felt faint, but did not lose consciousness, and he was able to walk across the room with difficulty to a chair. Within a quarter of an hour his lower extremities were completely paralysed, and his left leg was anæsthetic. He was removed to hospital in a few hours. Beyond the fact that he was a painter, there was nothing noteworthy in his personal history, and he came of a healthy family. On admission to hospital he was found to be a well-nourished, grey-haired old man, rather anæmic. He was unable to walk, but he could move his legs slightly. He still suffered from severe pain in his back, but he had already recovered sensation in his left leg. Everything he ate or drank was vomited. His arteries, in which there was visible pulsation, were atheromatous, and his pulse was high tensioned. The heart was hypertrophied; no murmurs

could be detected, but the aortic second sound was accentuated. He was carefully examined for aneurysm, with a negative result. Pulsation could be felt in both of his femoral arteries. There was marked *arcus senilis*, and his gums showed a "lead line." His urine was feebly alkaline, of sp. gr. 1014, clear, contained 0·2 per cent. albumen, and a few hyaline and granular casts; neither sugar nor blood was present; the quantity of urine passed was about the average amount. He had control over the sphincters of the bladder and rectum. The knee-jerks and plantar reflexes were lost.

The pain in his back ceased after twelve hours, and next day he felt much better, and he was able to move his legs freely. On the following morning he was able to walk a few steps, and he expressed himself as feeling almost quite well. At this period I showed him to the hospital class, and I diagnosed the case as plumbism and chronic interstitial nephritis, with the usual cardio-vascular changes. I pointed out that the history of the attack clearly indicated some vascular lesion of the spinal cord, and the sudden onset, wide diffusion, and intensity of the pain, together with the transient duration of the paraplegia, appeared to justify the further diagnosis of spinal meningeal hæmorrhage. The patient was apparently well about four o'clock in the afternoon, when he took a drink of milk. Five minutes afterwards the nurse found him dead in his bed. His death occurred about fifty-two hours subsequent to the onset of the symptoms.

The *post-mortem* examination, which was made within twenty-four hours of his death, showed the right pleural cavity to be filled with blood. The pericardium contained a little clear serous fluid. The heart was rather large, there being hypertrophy of the left ventricle. The arch and upper part of the descending aorta was distended and formed a tumour-like mass, from which the blood had escaped into the right pleura. On opening the aorta its inner aspect was covered with atheromatous plaques, and a dissecting aneurysm extended from the arch, at the level of the innominate artery, and terminated in the left femoral artery about an inch below Poupart's ligament. A large mass of freshly-coagulated blood was effused between the tunics at the level of the arch and in the upper portion of the descending thoracic aorta, and here the separation of the tunics took place around nearly the whole circumference of the

vessel wall. From the abdominal aorta through the left common iliac, external iliac, and femoral artery the coats of the vessels were separated by a thin layer of coagulum, but no palpable thickening of the arteries was so produced. In the lower part of the aneurysm the dissection of the arterial coats did not extend much more than halfway around the circumference of the vessels.

The microscopic sections, which were exhibited, were from the left common iliac artery, and they showed that the blood was effused in the substance of the middle tunic of the artery, so that the external wall of the aneurysmal canal was composed of the outer muscular strata of the media together with the adventitia. The dissection was carried along the coats of the right renal artery, the lumen of which was also occluded by a thrombus. The lumbar arteries were cut across, and their orifices likewise contained thrombi. A large coagulum was adherent to the posterior wall of the aorta at the level of the renal and lumbar arteries.

The external rupture of the aneurysm was situated about the middle of the thoracic aorta on its posterior aspect. The rupture was an ill-defined, oblique slit, about half an inch long, from which the blood had forced its way through the connective tissue into the right pleura.

I have not been able to satisfy myself as to the position of the internal rupture. It might have occurred two or three inches from the termination of the abdominal aorta, for the atheromatous changes were most intense in that position, or possibly it took place at the origin of one of the primary branches of the aorta.

Both kidneys were cirrhotic, the right one being, in addition, cystic and extremely engorged with blood. Microscopic sections of this kidney (prepared by Dr. Dargan in Dr. McWeeney's laboratory) showed that it was in a condition of universal hæmorrhagic infarction. There was no hæmorrhage in the spinal cord or its membranes.

In the light of the necropsy it is not difficult to account for the symptoms of this case. As predisposing causes of dissecting aneurysm my patient had extensive atheroma of the inner coats of his aorta, which were consequently unduly lacerable, and, in addition, he had hypertrophy of the left ventricle with high arterial tension. The intense pain at

onset of the symptoms was due to the primary rupture and separation of the coats of the aorta by the blood; the paraplegia was caused by the interference with the arterial supply to the lumbar enlargement of the cord, partly from thrombosis, and partly from rupture of the lumbar arteries; the sudden death ensued on the rupture of the external wall of the aneurysm and the consequent escape of blood into the right pleura. It is rather remarkable that his urine contained no blood, and that the amount passed was not noticeably diminished, for the right kidney was engorged with blood, and its secretion must have been completely arrested.

Other cases of dissecting aneurysm have been recorded in which a remarkable series of symptoms was due to arrest of vascular supply to the brain, kidneys, or cord.

Tessier's[10] patient died with the symptoms of apoplexy, and a dissecting aneurysm was found extending from the arch of the aorta along the innominate artery and its branches to the internal carotid.

Todd's[14] case was characterised by hemiplegia and transient suppression of urine, and the *post-mortem* examination showed softening of the brain due to obstruction in the carotids, and it is probable that there was also obstruction in the renal arteries.

Sainet[15] records a case in which the patient became rapidly paraplegic.

Latham and Swaine's[16] case was diagnosed during life. The patient was suddenly seized with "agonizing" pain in his chest followed by paraplegia.

In Dickenson's[17] case a policeman, after seven hours on his beat, was seized with loss of power over his lower extremities, followed by pain and collapse. Death took place within 24 hours.

Where the symptoms are liable to such variations, it is evident that the diagnosis of dissecting aneurysm must always be difficult and uncertain.

In reference to treatment, Walshe[8] somewhat cynically remarks, "Were the practitioner fortunate enough to divine the occurrence of acute separation of the coats of the aorta, it does not appear that in the present state of our knowledge the management of the case would be materially improved by his sagacity. Did he fail to diagnose the occurrence, his aim would be to restore the patient from the first shock of the accident, control excited arterial action, and relieve symptoms as they arose. And it does not appear that art could do more than this were the anatomical nature of the affection understood from the first."

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Dr. Finny said that Shekelton's aneurysm was a modification of dissecting aneurysm, and was not necessarily the first sort of dissecting aneurysm described. There were two forms—one in which the blood bursts externally (the original kind); and the other form, Shekelton's aneurysm, in which the blood, after having travelled a certain distance down, re-enters the original channel. He related a case of aneurysm of the abdominal aorta which he had treated. Two year's later patient's health failed,

and he died. Autopsy showed that it was a case of Shekelton's dissecting aneurysm, beginning high up and dividing the coats of the artery practically into two layers, and ending at the external iliac arteries. From the anterior half of the dissection had sprung the aneurysm which he had treated. There was a secondary aneurysm in one of the branches of the arteries forming the cœlic axis. The larger branches going to the kidneys were all coming from the anterior part of the vessel, while the lumbar arteries were coming from the renal part of the vessel. In Dr. Coleman's case he presumed that the sudden pain with which the patient was attacked while on the ladder showed the dissection going down, the blood forcing its way, and probably blocking some of the vessels going to the spinal cord and the lumbar arteries.

Dr. Knott said that three varieties of dissecting aneurysm had been described—one where the blood went between the coats of the vessels and found its way out at some distance, and became a false aneurysm; a second, and more typical form, is where the blood has tunnelled its way between the coats of the artery, and found its way to the artery again; a third variety is where the blood travelled for some distance between the coats, and does not go in or out.

Dr. Coleman, in reply, said that he was aware that Shekelton's aneurysm, as described by Shekelton himself, was a chronic aneurysm, but he had understood that the term Shekelton's aneurysm was improperly applied to dissecting aneurysm in general.

SECTION OF SURGERY.

OPERATION IN INTESTINAL OBSTRUCTION.

By SIR WILLIAM THOMSON, F.R.C.S.;
President Royal College of Surgeons, Ireland; and of the Section of Surgery, Royal Academy of Medicine;
Surgeon to the Richmond Hospital.

[Read in the Section of Surgery, November 12, 1897.]

I was reading the other day some of the late Sir Benjamin Ward Richardson's papers, when I came upon one bearing the title—"What is the proper time for Surgical Interference in Intestinal Obstruction?" He was a close clinical observer, and a broad-minded cultured physician, and I read with the greatest interest his discussion of this question. We have to deal with the fact that these cases usually come, in the first instance, into the hands of the medical rather than the surgical practitioner. It is reasonable to expect that this should be so, for the ordinary sick man does not see that there can be anything involving operation in an attack which popularly is described as a pain in the stomach with vomiting. The paper suggested to me that I might ask your attention to a few points in connection with this subject. It has often been before the Academy and other like bodies, but all acknowledge the difficulties which surround it; and it can only be by further observation and careful noting of signs and symptoms that we can make any approach to an answer which, as deciding a course of treatment, can be of any real benefit.

The initial difficulty which we encounter is that there are so many conditions threatening life which present symptoms

of an almost identical character. We are accustomed to take three of these as very typical—pain, vomiting, and constipation—and as practically constituting a guiding trio. But if we apply them as a test to the reading of a case, we find ourselves bound to include such affections as peritonitis, gall-stones, volvulus, strangulation, pressure of tumours, stricture, and even a calculus in the ureter. Now, not all of these require operation of necessity, and, therefore, we must seek for other elements of help. The age of the patient, the antecedent history, the condition of the abdomen, the amount of distension, whether the constipation has been chronic or has been gradually increasing, the character of the urine, the quality of the fæces, the temperature—which is not very reliable—and the actual constitutional state of the patient as indicating collapse or shock.

Now the tangle to be unravelled is a very troublesome and serious one. It is often said that we see these cases too late, and that is true; but let us be quite fair about this matter. We generally see the case when the question of operation and no other is to be determined. If we had seen the patient at first we should in most instances have been just as reserved as our colleague, and all I would suggest is that a surgeon should be consulted early, in order that, if operation is necessary, he who becomes the responsible actor should be able to select the most suitable time for his operation.

And I must say, further, that all surgeons are not agreed as to operation at all. You all recollect, I have no doubt, the dicta of Mr. Jonathan Hutchinson, a wise and very experienced surgeon. Before the British Medical Association, in 1878, he advocated taxis in obstruction, and declared that "in the present state of surgical knowledge exploratory operations for the relief of abdominal obstruction, the cause of which cannot be diagnosed, are not warrantable." Elsewhere, however, Mr. Hutchinson introduced the alternative—

"or the operation can be made much less dangerous," which in these days makes a difference.

It is only nineteen years ago since this opinion was expressed by so sound a surgeon; but it is a proof of how rapidly we have travelled in the interval when I mention that in the year following Mr. Howard Marsh mentions in a paper that "several operators have reduced the mortality of ovariotomy to less than 30 per cent." Well, the 30 per cent. has vanished, and we are doing much better in operation for intestinal obstruction. Let me refer again to the physician Richardson in this connection. He says, "I fail to find in the list of examples which have come under my notice during a long career, one single instance in which recovery has taken place after the appearance of stercoraceous vomiting in the acute form, except in one where operation was carried out. . . . We did not operate in another case because we were in the dark." My argument in such a dilemma now would be—"Because we are in the dark let us let in the light." That is, I think, a concise way of putting the modern surgical view.

Let us just consider in order the symptoms which belong to this condition of acute obstruction. It is an advantage to group them, and if possible to recognise their true significance.

I take vomiting first. In its ordinary form this is a symptom which attends many constitutional states which have nothing whatever to do with the affection we are considering. But here the vomiting has certain peculiarities. It is not the first symptom. It follows the onset of abdominal pain which has come on suddenly or gradually, and we have therefore the occurrence of two symptoms which have great importance. The vomiting varies as to quality, and this has a certain relation to the position of the obstruction. If this is high up—in the region of the duodenum or jejunum—

the vomiting comes on very quickly, because they are very sensitive viscera. But the material ejected is not stercoraceous in the ordinary sense. It first consists of stomach contents, and then of material undergoing digestion in the first reaches of the intestinal canal. But as we go lower down to the end of the small intestine, and get to the large intestine, the vomiting comes on at greater interval from the origin of the attack, passes through the stages I have noted, and then becomes stercoraceous, just as we so often see it in strangulated hernia. Therefore I think it will be admitted that vomiting in these cases does tell us, by the order of its appearance and its character, that we have to deal with obstruction, and where that obstruction probably is.

This symptom is of great importance, and it was upon it that Sir Benjamin Richardson answered his own question when he said, "Is there any single symptom which, being present, says at once and imperatively, in cases of acute obstruction of the intestinal canal, now is the time—whatever may be the diagnosis of the case—now is the time to operate? . . . I answer there is such a symptom, and the symptom I refer to is that of stercoraceous vomiting." The late Mr. Greig Smith laid down a working rule which was—that operation should be undertaken if pronounced vomiting had occurred three times. Of course there was no special virtue in the number. It only gave a reasonable time to make the character of the symptom clear.

Pain is of value in locating the trouble within the abdomen, but it rarely indicates the actual site of the obstruction. It has, however, characters of its own. In chronic obstruction it is not severe; and it differs from that of the acute affection which comes on suddenly, and is usually intense. Sometimes there are intervals of quiescence, sometimes the pain may be almost continuous, and the difference seems to depend upon the tightness of a constriction, and on whether there still

remains any portion of the lumen through which matter may pass.

Temperature is often misleading, and is only to be mentioned to warn against reliance being placed upon it. How often have we seen patients die of peritonitis, and yet the chart gave little or no indication of the intensity of the disease?

On the constipation itself we must also not place too much reliance. It depends very much upon the position of the stoppage. If it is high up in the intestine, motions may persist for some time, and even a diarrhœa may appear for a day or two. If the stoppage is in the large intestine we have the constipation from the outset, although sometimes a loaded rectum below the point may puzzle us by discharging its contents.

A good deal of weight has been attached to the presence of dulness in the loin in these cases, due to free fluid in the peritoneal cavity. It is not always present. It depends upon peritonitis, but that is not always of the serous variety, and no appreciable exudation may be present. When it is present it is, however, a valuable aid, and should be looked for. Here I may recall some cases reported before the Clinical Society of London in 1879 by Dr. Markham Skerritt, of Bristol. In the first there was intestinal obstruction, with fibrinous exudation. During life there was dulness in both flanks when the patient lay on his back. It could be detected as high as the anterior superior iliac spine. When the patient was turned on his side the side which was uppermost became very resonant, and during the progress of the case the sign became more marked. *Post mortem*, it was found that there was no fluid in the peritoneal cavity, but the intestines were filled with fluid fæces and gas. In the second case the dull note could be produced up to the anterior superior iliac spine; the resonance appeared when the patient was placed on his

side, and on *post-mortem* examination no fluid was found in the peritoneal cavity. Dr. Skerritt says the peculiarity was due to the fact that the gas and fluid in each coil of intestine necessarily obeyed the same physical law as do the gas-containing intestines and the free fluid in ordinary ascites—that is, that the gas would rise to the top in whatever position the patient lay, and the fæces would fall to the bottom. The observation is an important one. Fluid in the loin is not invariably present; and we may be betrayed into a declaration that it is there when in reality it is not there, and when the signs are due to the fluid and gas within the intestine itself.

Two other localising symptoms may be mentioned—the increase in the indican of the urine found by Jappe when the small but not the large intestine is obstructed; and the second described by Dr. Barlow in "Guy's Hospital Reports" for 1844. He declared that urine was suppressed just in proportion to the nearness of the stoppage to the beginning of the small intestine, and that this does not occur where the large intestine is engaged; but this is not invariably true.

Other considerations are the character of the distension and the time of its appearance. It is naturally somewhat slow to become evident when the mischief attacks the large bowel, but once it begins it extends rapidly. In the case of the small intestine, if the obstruction is high up, the abdomen ought not, theoretically, to become distended. But even here other things happen to upset our expectations. If peritonitis supervene we may expect some adhesions or bendings here and there which will stay the passage of flatus to the anus, or the injury to the bowel may be such as to produce paralysis, and so be followed by the accumulation of gas within the gut.

To all these, however, we must add for consideration the general condition of our patient, the character of the

facial expression, and the collapse which in some form is always present, and is even progressive.

I have brought before you a series of tests which are generally accepted in the effort to clearing up the problem before us, and I have tried to point out their individual value. If we were able to apply them all to any case we should probably have small difficulty in dealing with it. But unfortunately that is not so, and our success will depend upon the ability with which we can select such a combination of them as will lead us aright. I place the greatest value upon vomiting of a stercoraceous nature, but we should not fail to avail ourselves of every possible corroborative element.

You have gathered from what I have said that I wish only to deal with the surgical aspect of this great question. I wish to start from a recognition of the affection, and leave out of consideration all medical treatment. But indeed, in the vast majority of cases of acute obstruction to which I have confined myself, there is no room whatever for medical treatment. It is only time lost. And passing first to what may be called bloodless surgical interference—taxis—I must declare that it has no attraction whatever for me. Here and there a case may recover, but the surgeon ought to be sure not only of the locality of the obstruction, but also of the very nature of it, before he begins to manipulate the whole mass of intestines. What would happen if a nipped bowel were almost gangrenous, or if the intestine were distended like a drum?

Two days ago I was returning the bowel in a case of large hernia, when, even under very moderate pressure with my fingers, the peritoneum suddenly snapped with a sound like a small explosion, and there was a bleeding rent of a couple of inches long. Would this be a desirable injury to add to the peritoneum in a case of acutely obstructed intestine? I think not.

The whole of the opposition to operation in these cases is based upon the unfortunately fatal results which have followed it. But I am glad to say that these are becoming less in number just in proportion as the great gravity of the affection is being realised. We may ask in return what proportion of cases not operated upon recover? We hear of the sloughing away of a volvulus and such things, and the patient gets well. But how many? These things are practically miracles—they are contrary to the course of nature. We do not conduct the ordinary affairs of life on the supposition that a miracle is likely to happen; and I suppose a practitioner who relied on medicine to cure, say a strangulation, would be horrified if it were put to him that that is practically what he is doing. Granted the recognition of the character of the case, there is only one thing to be done, and that is—to explore. It is not the opening of the abdomen that kills; it is the fact that that is usually done when by delay everything is arrayed against success.

A CASE OF CHRONIC SUPPURATIVE MIDDLE-EAR DISEASE WITH INTRACRANIAL COMPLICATIONS.

By ROBERT H. WOODS, M.B., F.R.C.S.I.;
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[Read in the Section of Surgery, November 12, 1897.]

The time is within the recollection of the youngest of us when intracranial abscess meant certain death. To-day it is not too much to say that with proper treatment the chances of recovery are distinctly in the patient's favour. This change is partly the result of the spirit of investigation which in the recent past has dominated the work of our profession, and partly to the genius of one man, whose achievements have been something for the rest of us to wonder at.

Professor Macewen was the first to co-ordinate and elevate the treatment of brain abscess, and to him must be ascribed the credit of having shown the laws to which the condition is subject and the evidences by which its presence, from being a matter of conjecture, becomes one of high probability. For my own part I must express my indebtedness to him for any knowledge I may possess on the subject, or any success that may have attended my efforts in this direction.

I hope the following case will have sufficient interest to warrant my bringing it under notice:—

Case.—M. C., aged twenty-eight, railway guard, was admitted to the Hardwicke Hospital under the care of Dr. O'Carroll on September 21st, 1895, having been sent in by Dr. O'Connell Redmond, who suspected intracranial mischief as the cause of his malady.

Previous History.—Fifteen years previously he had scarlatina. For the past seven years his left ear has been intermittently discharging fœtid pus. He suffered from chronic constipation.

History of the Attack.—The discharge from the ear stopped on September 15th (that is seven days before admission), and he was attacked by violent throbbing headache, principally affecting the left side and occipital region. He lost appetite, became thirsty, shivered repeatedly, and was inclined to be sick, but did not actually vomit.

Condition on Admission.—The patient looked dazed. His pupils, especially the right, were dilated, but reacted slowly to accommodation and to light. The eyes were prominent, the lids not touching the corneæ. The tongue was covered with fur, brown in the middle and white towards the tip and edges. He was perspiring freely, and the body was covered with a sudaminous rash. He complained of great pain in the abdomen, especially in the right iliac region. A loud systolic murmur was to be heard in the mitral area, and could be followed into the axilla. The upper angle of the left posterior triangle of the neck just at the base of the skull was very tender, especially on firm pressure. His stools were yellowish and fluid. He had no paralysis, motor or sensory.

The case was one of some obscurity, and although the likelihood of the brain being affected was not lost sight of, the first idea was that it was a case of severe typhoid fever; and this presumption was favoured by the evidence afforded by the character of the stools, the tenderness and gurgling in the right iliac fossa, and the absence of symptoms that could reasonably be taken as pointing to any other cause for the malady. No typhoid rash, however, could be seen. At Dr. O'Carroll's request I examined him on September 30th.

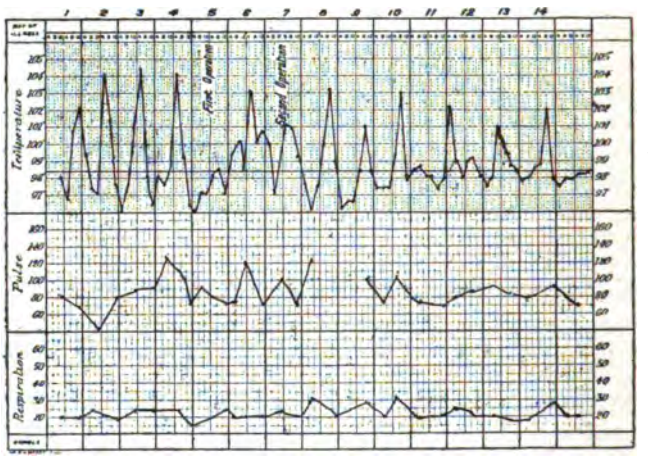
The body was almost constantly bathed in sweat. His breath had a very disagreeable odour, and the teeth were covered with sordes. He frequently lost consciousness, was unable to recognise his relatives, and became very restless, getting out of bed and tossing the clothes about. Cerebration was slow; even in his more lucid moments it was difficult to get him to answer questions coherently. When asked his address he gave a former

one, and he was unable to name familiar objects, though he understood and could tell their function. Thus, when shown a bunch of keys he could not by any effort think of their name, though when asked what they were for he had no hesitation in replying that they were for opening locks and doors. Similarly, when shown a pocket knife, without being able to say what it was, he could tell that it was useful for cutting tobacco, and if in the same moment he was shown a plug of tobacco he had the same difficulty in naming it as if he had not used the term at all. Or if one persisted in the question he might call it an overcoat or a walking stick, or something equally absurd, though he was quite aware it was used for smoking or chewing. His pulse was feeble, but not frequent. He was emaciating rapidly in spite of the fact that he took fluid nourishment fairly well. He complained of thirst, a bad taste in the mouth, and of frontal and occipital headache. He was on one occasion observed to have a slight degree of opisthotonos during a rigor. Ophthalmoscopic examination showed that he had double optic neuritis. The urine (sp. gr. 1037) was acid, and there was a precipitate of urates and a trace of albumen, but no sugar.

His temperature was now taken every four hours, and the difference between the curve on the ordinary clinical chart and that of the four-hourly chart was most marked and most instructive. The ordinary chart, which for curiosity's sake was marked at the same time, showed a curve varying two or three degrees from day to day without any regularity, and so devoid of character that absolutely nothing could be learnt from its inspection, or, worse still, whatever was learnt was wrong. Some idea of its deception may be formed from the fact that on October 3rd, when the patient was at his worst when, as shown by the four-hourly chart, his maximum and minimum temperatures for the day differed by 8·5° F., the ordinary chart told nothing more than that at a certain hour in the morning his temperature had been 98° F., and in the evening 99° F., a not very serious condition if the chart was the only guide to one's opinion. This is as good an illustration as one can have of the danger of using ordinary tem-

perature charts where intracranial pyogenic trouble is suspected.

On examining the four-hourly chart it will be seen that on the days immediately preceding the first operation there is the most marked similarity between the sequence of events. On each day the morning temperature was subnormal by a degree or even two; in the middle of the day a rise coincident with rigor occurred, the temperature passing 104° F., followed by a fall to subnormal again as night approached.



After we had thus observed him a few days there seemed to be no doubt that whether he had typhoid fever or not he was suffering from intracranial mischief, the result of the suppurative ear disease, and from the character of the temperature chart, the tenderness in the posterior triangle of the neck, and other symptoms, a diagnosis was made of sigmoid sinus thrombosis.

First Operation, October 5th, 1895.—The patient being too ill for removal to the Surgical Hospital was chloroformed in bed. A vertical incision was made immediately behind the left ear, and the bone removed from Birmingham's triangle with mallet

and gouge until the mastoid antrum was exposed. From this cavity a quantity of very fœtid cholesteatomatous *débris* and granulation tissue were removed, and exit given to a few drops of greenish pus. The antral walls were inspected, but no matter could be seen escaping. The bony opening was then enlarged backwards until the groove for the sigmoid sinus was opened up. The sinus was of a dark greenish colour, the walls softened, and the lumen plugged with a septic thrombus. The sinus was slit open and the clot scraped away with a Volckmann's spoon. The dura mater was then lifted gently away from the bone in various directions. An abscess was found on the cerebellar aspect of the petrous bone, and about two drachms of fœtid pus evacuated. This was probably extradural. The cavity was syringed out with carbolic lotion, a drainage tube inserted, and the outer portion dressed with iodoform gauze.

The patient was much benefited by the operation, but not so much as we expected. The temperature was lower, the pain and perspiration less, but his mental condition remained blurred, and he had the same form of amnesia and to quite the same degree as before operation. Professor Macewen points out that the symptoms of extradural abscess or sigmoid sinus thrombosis always dominate and mask those of brain abscess when they occur together, and that it is not until the dural condition is relieved that reliable evidence of the brain abscess can be obtained. This was clearly a case in point, and it was concluded that there was yet another lesion, probably brain abscess, unrelieved. The symptoms pointed rather towards the cerebrum than the cerebellum as the seat of the trouble; but the fact that I had already found pus in the cerebellar fossa warped my judgment to the extent of making me believe the cerebellum to be the more likely place. I, however, decided to place the exploratory wound so as to have access to both cerebrum and cerebellum.

Second Operation, October 7th.—The patient being still too ill for removal, this was also performed as he lay in bed. A trephine hole was made behind and above the mastoid

process, opening directly over the lateral sinus so that access could be had both above and below the tentorium. Great care was taken to prevent contamination from the mastoid wound, which was now discharging fœtid pus. A hollow needle was passed into the cerebellum three times with negative result, so it was decided to try above the tentorium. The punctures in the dura mater were therefore sealed by being liberally sponged with compound tincture of benzoin to ensure against contamination from the neighbouring pus. In order to get quite clear of the lateral sinus, it was found necessary to enlarge the trephine hole slightly upwards by taking a half moon out of its upper edge; this having been done, the temporo-sphenoidal lobe was tried, and at the third insertion of the needle we were rewarded by the appearance of pus. A crucial incision was made in the dura mater and a pair of catch forceps entered along the track of the needle and withdrawn with the blades open. Exit was thus given to over four drachms of horribly fœtid pus, together with numerous brain sloughs. The cavity was washed out with weak carbolic lotion and a drainage tube inserted. Notwithstanding the fact that he had a mitral murmur, we felt bound at both operations to give him chloroform rather than ether, on account of the unsuitability of the latter in such cases, and it is worth noting that he took the anæsthetic perfectly.

After-history.—The pulse-rate, which before operation was 72, rose after evacuation of the abscess to 96. The patient made steady, if somewhat slow, progress to complete recovery. He complained a few times of pain in various points of the chest; he had slight cough, but there were no physical signs. Ten days after the first operation there was no albumen in the urine; the temperature was normal, and so remained during his stay in hospital, except for three temporary rises, due on two occasions to blocking of the cerebellar drainage tube by sloughs, and on the third to a bud of granulation tissue, which grew into the lumen of the tube through a hole in its side. From the beginning of the attack until about October 15th—that is, for about a calendar month—his mind was a complete blank. He remembered nothing of the operations, nor the fact that he had consented to their performance. He slowly recovered from his amnesia by first being able to name more familiar objects and afterwards others. Though when in health one of the most placid of men, during convalescence he was emotional and excitable; more than once the idea possessed him that indivi-

dual nurses had treated him unkindly, whereupon he denounced them with a degree of fervour and sincerity born only of the deepest conviction, but for which he was truly penitent when the enormity of his offence was later on brought home to him. The temporo-sphenoidal drainage tube was removed before many days; the tube to the cerebellar fossa was kept in for several weeks, and withdrawn very gradually. The wounds were quite dry, and there was no appearance of discharge from the ear. On November 14th he was allowed up. The rapidity with which he lost flesh during his illness was only exceeded by the rate at which he fattened during convalescence.

Vision.—On December 2nd his field of vision was examined by Mr. Swanzy, who found that he suffered from incomplete right homonymous hemianopsia, due probably to implication of some of the optic radiations in the temporo-sphenoidal lobe. Six weeks later this had so far improved as not to interfere with the performance of his duty as a railway man.

Epileptiform Seizures.—On December 14th, 1896, he was discharged from hospital, and a couple of weeks afterwards returned to his work, where he is still employed, though not as guard. On two occasions subsequent to his leaving hospital he was attacked by epileptiform convulsions. On February 11th, 1896, while at work his head swam and ached; on getting home he became faint, and the head and eyes were involuntarily turned towards the right as if trying to look over the shoulder, the arms and legs got stiff, his skin greatly congested, and he lost consciousness for fifteen minutes, after which interval he recovered. The second attack happened about six weeks later, and was of a similar type. It would seem as if these two seizures were in some way dependent on the state of his bowels. On both occasions he was badly constipated, and was completely relieved by purging. Since he has paid more attention to his habits he has not for over twelve months been similarly troubled.

Mental Condition.—He is at the present time in full possession of all his faculties. The ear is perfectly dry, and he is able to discharge with efficiency his duty as keeper of a railway crossing.

The President congratulated Mr. Woods on the result which had attended his operation. Such cases, so far, had not always been so satisfactory.

Sir Thornley Stoker said he rose principally for the purpose

of complimenting Dr. Woods. He (Sir Thornley) had seen the case, and could bear testimony to the exact and very modest report which Dr. Woods had made of his work in connection with it.

Dr. Finny asked whether at the time when the pus was being cleared out of the lateral sinus or any abscess, the attention of the surgeon should be then and there directed to the ear with the object of trying to remove any disease there.

Dr. Frazer spoke.

Mr. Pratt would like to ask Mr. Woods why he had preferred to use a mallet and chisel.

Mr. T. Myles joined with the others in congratulating Mr. Woods. Mr. Pratt had asked a question about the mallet and chisel. Well, this was one of the first operations of the kind that had been performed, and the equipment now used for the operation was not then to the fore. Mr. Woods had since that operated with a burr.

Mr. M'Ardle said that he had seen Mr. Woods use the mallet and gouge. He, himself, preferred the gouge. There was a great difficulty in guiding the electric burr.

Mr. Fitzgibbon said that the question as to the use of the gouge or the use of a burr, or the use of a trephine, must depend to a great extent on what is found after the incision.

Mr. Lentaigne also spoke.

Dr. A. R. Parsons said that he (Dr. Parsons) would like to know from Mr. Woods what reason he had for believing that, while the patient might have been suffering from abscess of the brain, already general infection of the blood supply had not taken place, and that the patient was not suffering from ulcerative endocarditis.

Dr. Harvey spoke.

Dr. R. Lane Joynt said he would like to ask Mr. Woods when he opened the mastoid bone and exposed the lateral sinus in what state he found the thrombus, and if it was septic at the time. If it was septic, he (Dr. Joynt) supposed that Mr. Woods would have opened the jugular vein in the neck below. Whether the consideration occurred to him that concussion of the brain occurs in the use of chisel and mallet.

Mr. Croly said that he had to join with the previous speakers in offering his congratulations to Mr. Woods.

Mr. Patteson said that there was one point to which he wished to refer, that was as to the advisableness of using the trephine, or the gouge, or the electric burr. He believed that the

gouge was an instrument admirably adapted to the purpose, and could be regulated very distinctly, and was altogether a much better instrument than the burr.

Mr. Woods replied. Dr. Joynt had asked what was done with the clot in the lateral sinus. His reply was, that he had cleared out the lateral sinus as far as he could reach it. He did not tie the internal jugular vein, and he thought that, perhaps, it would have been better if he had done so. Mr. Tobin had asked how to deal with the primary fault in the ear. The procedure which he (Mr. Woods) adopted, and the one which he considered the correct one, was Macewen's—first to get at the mastoid antrum, then inspect it after cleaning it out. Mr. Pratt had instituted a question between mallet and chisel and trephine. Well, in these cases, it is comparatively rare, in fact had never occurred to him (Mr. Woods), to find softening of the mastoid bone in cases of intracranial abscess, and he thought that the reason why there was intracranial abscess at all was because the bone was so hard that the pus could not get out, and, therefore, it was precisely in these cases that there was the greatest difficulty in getting through the bone, because there was a sclerosing osteitis set up which eburnated the mastoid process, and made it exceedingly difficult to get through, and it was in these cases that the burr is so useful. The possibility of causing concussion of the brain by blows of the mallet was, he thought, a remote one.

ON TWO CASES OF TETANUS SUCCESSFULLY TREATED WITH ANTITOXIN.

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Surgeon to the Meath Hospital and County Dublin Infirmary.

[Read in the Section of Surgery, December 10, 1897.]

In introducing to you what amounts to a discussion on the subject of the treatment of tetanus, it is not my intention to trespass at any length on your patience. The treatment of acute infective processes by means of serum injections is still so far in its infancy that but little is definitely known as to the ultimate results obtainable, and therefore every contribution to the subject has its merits enhanced by the uncertainty that surrounds the issue. The theory on which the treatment is based is familiar to you all; and as my object in bringing these cases before you is to elicit information from the experience of others, and not to ventilate any crude opinions of my own, I shall deal with them as briefly as possible.

Case I.—N. C., aged fourteen, was admitted to the Meath Hospital on 13th August, 1896, having been sent in by Dr. Davy as a case of incipient tetanus. The following history was elicited:—About twelve days previously he had trodden on a thorn, which entered the web between the first and second toes of his right foot. The thorn was removed, and no pain or trouble was experienced until after the expiration of a week, when a small sinus opened between the two toes on the inner aspect of the second, and commenced to discharge a thin serous fluid. This spot was slightly tender. Four days later—that is, eleven days after the receipt of the injury—he noticed his jaws beginning to stiffen, and complained of vague pains in his back. On admission trismus was well marked—the power of separating the teeth being limited to half an inch; he could not eat, but could take large quantities of liquid nourishment.

The abdomen was hard, the neck muscles stiff, so that he carried his head awkwardly. Temperature 98·8°; pulse normal. No spasms had hitherto occurred. He was placed in a ward by himself, and a special nurse appointed. He slept fairly well during the early part of the night, but at 6 a.m. the following morning a severe clonic spasm with intense pain developed. When I saw him later on the rigidity was well marked, the head retracted, the back arched, the abdomen tense as a board, while the recti stood out on either side like the muscles of a gladiator. Risus sardonicus was typically present. Any effort to speak caused spasm of the facial muscles, and barely the tip of the tongue could be protruded between the teeth. Fifteen grains of dried serum—the only kind immediately available—were injected into the muscles of the back, but owing to its insolubility a large proportion of this failed to pass through the syringe. A well-marked spasm occurred at the time, and the boy was evidently in great pain. Subsequently a supply of the liquid serum, prepared at the Pasteur Institute, was obtained through Messrs. Fannin, and this form alone was afterwards employed in both cases. The serum is put up in flasks, each containing 10 c.cm., which is the dose for a single injection. The wound in the foot was carefully examined. Some of the serum was dried on cover-glasses and stained for bacilli, but with negative results. After careful and thorough disinfection the wound healed slowly and without incident. Two further injections were given—one at 4 p.m., and one at 8 p.m. The evening temperature was normal. In addition to the antitoxin, a drachm of chloral and a drachm of potassium bromide, divided into four doses, were given during the night. Thirteen spasms, varying in severity, occurred during the same period, the greater number between 11 p.m. and 2 a.m. He slept well in the intervals and perspired profusely.

The next day, and indeed throughout the remainder of his illness, the pulse and temperature remained normal, nor was there much dyspnœa during the spasms. Three injections of serum (30 c.cm. in all) were given during the day, and three doses of the bromide and chloral during the night. He had eight spasms, none of marked severity, and passed, on the whole, a good night. The following day, Sunday, 16th, three injections were also given and the bromide and chloral discontinued. He had six spasms before 2 a.m., the last of marked severity, the end of the tongue being almost bitten through. After 3 a.m. he slept well. Briefly summarised, the rest of the history is as follows:—

17th.—Three injections as before; fourteen spasms at intervals during the night.

18th.—Two injections during the day; some slight spasms; twelve spasms during the night.

19th.—Two injections; trismus less pronounced; can protrude the tongue a little; three spasms during the day and nine during the night.

20th.—Two injections given. Was able to-day to eat a little bread and butter. Three slight spasms during the day, and one severe spasm during the night; slept well.

21st.—Two injections. All the symptoms show improvement; the rigidity is much less, and the spasms less frequent and less severe—only three during the twenty-four hours.

22nd.—Two injections; had a good day, but had nine slight spasms during the night.

23rd.—No injection given; six slight spasms during the night.

24th.—Three injections given, as the spasms had been increasing in frequency; one very slight spasm during the night.

After this date no more injections of serum were given. In all twenty-three had been administered. The following night he had two very slight spasms.

On the night of the 26th—the second night after stopping the injections—the spasms recurred, seven in number, and potassium bromide was again resorted to. Two nights later one very slight spasm occurred, but after that convalescence was uninterrupted and rapid. He was allowed up on the 30th of August, seventeen days after admission. For a couple of days afterwards any sudden shock or noise would bring on a slight spasm, lasting only a few seconds. A few days later he was sent home perfectly well.

Case II.—J. K., aged nineteen, a gardener, was admitted to the Meath Hospital on the 11th of August, 1897. He gave the following history:—About a fortnight previously he got a fall off a cart, injuring his right knee. The skin was broken and it did not heal up, although he was not prevented from following his usual occupation. A few days ago he noticed the muscles of his neck becoming stiff, and found that he could not masticate freely, and as these symptoms were gradually increasing he sought relief at the hospital.

On admission he presented well-marked rigidity of the spinal muscles, cervical and dorsal. The back was arched, the head thrown back, the abdominal muscles rigid and prominent, the risus

sardonicus was pronounced, and only the tip of the tongue could be protruded between the teeth. His temperature was 101·8°; pulse 80. Spasms were tolerably frequent but not severe. The patient was isolated, and an injection of 10 c.cm. of serum was given at noon, and again at 5 p.m. He was able to take fair quantities of beef-tea and milk, and slept well during the night. The following morning the temperature had fallen to 99°, the pulse was quieter—64—but the spasms had been frequent and trismus was more marked. Three injections were given during the day. The arching of the back and the abdominal rigidity were more marked. The evening temperature was 100·6°; pulse 64. The spasms were less marked in intensity during the night, and he slept at intervals. In the morning the temperature was normal. The wound on the knee, which had previously been carefully cleansed, was now thoroughly cauterised with pure carbolic acid, the eschar involving a considerable area of the healthy tissues around. There was no discharge from the wound.

On the 13th—the third day after admission—only two injections were given, as the supply had run out. He continued to take large quantities of nourishment, as, although the teeth were tightly clenched, he was able to swallow fluids freely through some existing gaps. During the twenty-four hours he took 2½ pints of milk, 2 pints of beef-tea, and an egg beaten up. On the following day—the 14th—three injections were given, and his condition in every way showed signs of improvement. The trismus was less marked, the spasms were diminishing in frequency and in intensity, and he was altogether brighter and more cheerful.

On the 15th only one injection was given.

On the 16th—the sixth day after admission—his temperature rose to 101·6°. Serum was administered, and the whole surface of the body was sponged. The temperature rapidly fell to 100°. A second injection was given in the afternoon, and another in the evening—11 30 p.m.—at which hour his temperature was normal. He passed a good night, and the following morning showed signs of decided improvement: the rigidity was much less, the spasms slighter, and occurring only at rare intervals, and the tongue could be protruded for about half an inch between the teeth. From this date his condition daily improved, and no further injections were given. He had got in all thirteen injections, which, as in the previous case, were administered deeply into the muscles of the

back and the gluteal region, and in no instance gave rise to any local or constitutional reaction.

On the 23rd—twelve days after admission—he was sent to the Convalescent Home, and after a fortnight spent there was able to resume his employment in perfect health.

Such, in brief outline, is the essential history of these two cases. I am quite aware that they are open to the obvious criticism that they belong to the type of tetanus which would recover if left to the *vis medicatrix Naturæ* alone. I can only answer—I have seen cases of tetanus with no more pronounced symptoms rapidly run to a fatal termination; and one is not justified in standing idly by while a remedy full of promise lies ready at hand.

Whether the future will justify our hopes can only be estimated by the conscientious record of every case, and it is in the desire to help this end that I lay these before you. At any rate, in this direction of serum therapeutics lies at present all our hope of combating some of the most terrible infective ills that humanity can ever suffer from.

NOTES ON TETANUS.

By J. KNOX DENHAM, L.R.C.P.;
Medical Officer, Donnybrook Dispensary.

[Read in the Section of Surgery, December 10, 1897.]

VERY reasonably it was hoped that the discovery of tetanic antitoxin would be followed by as brilliant results as those that have been obtained by diphtheritic antitoxin serum.

That these hopes have been disappointed must be admitted. I do not propose to weary you with the statistics of recorded cases to prove this, but will shortly refer to a case in my own practice, and lay before you my views as to the reason in this case, as in so many other cases, tetanic antitoxin serum must cease to be regarded as a specific cure in tetanus.

My patient was a gentleman from the North of Ireland, thirty-six years of age, very muscular and healthy, but of decidedly intemperate habits. Ten days after a fall on the back of the head, which caused a small wound, the first symptoms of tetanus developed. Within twelve hours of the first tightness of the jaws I commenced injections of anti-tetanic serum. He grew gradually worse for the next four days, the convulsions being terrible to witness, and almost incessant. There was complete rigidity of the jaws; the act of swallowing always produced a spasm. On the fifth day a distinct improvement was noticed, the convulsions becoming less frequent and less severe; the jaws became relaxed. On the seventh day of the disease the symptoms of tetanus had practically ceased to exist, he was able to fully open the mouth and take food, and, for the first time since his illness, was able to pass water without a catheter. All appeared to be going well, but, unfortunately, his heart now began to fail, and he died very peacefully on the eighth day from the first manifestation of the disease. From the commencement till the seventh day he received a hypodermic injection of the specific serum every sixth hour, and large doses of chloral to

overcome the persistent sleeplessness. The patient all through asserted that the injections gave him great relief, and although I am prepared to admit that the antitoxin serum had in this case a modifying effect on the disease, I cannot regard it as a reliable curative agent in any way comparable to anti-diphtheritic serum.

The reasons are as follow:—

The presence of diphtheria is betrayed at the very commencement of the infection by the constitutional symptoms, and, above all, by the appearance of the false membrane on the fauces, &c. The success of the antitoxin treatment in the disease depends largely on the fact that we are enabled to commence specific treatment almost *pari passu* with the absorption of the specific virus.

In tetanus the circumstances are totally different. The presence of the specific virus does not betray itself until it has already reached the central nervous system, and, therefore, until, so to speak, the system is saturated with the virulent microbic product.

In fact, the stage of the disease at which tetanus is first observed corresponds with what is known as post-diphtheritic paralysis. And what would we think if specific anti-diphtheritic treatment were deferred until the paralytic stage is reached?

One may say that in tetanus a suppurating wound is present. No doubt; but how are we to tell that the specific product lurks in the recesses of the wound. The true *rôle* to be played by anti-tetanic serum is immunising and preventative rather than curative, should the surgeon have to deal with lacerated wounds or compound and comminuted fractures which have been soiled with earth, manure, or the like, or with such punctured wounds as are occasioned by rusty nails or splinters of wood—cases which, perhaps, only come under observation some days after the infliction of the injury, and which, perhaps, are in an intensely suppurating condition.

These are the cases in which antitoxin serum receives its legitimate and most suitable application, and in such cases one may confidently assert that while the injection of the immunising serum will do no harm, it may ward off a great disaster. True, we cannot say in any individual case that the tetanus microbes are present, but I think it may, nevertheless, be asserted that the surgeon who has treated a large number of cases of this kind with anti-tetanic serum, and has not seen tetanus develop, may attribute this satisfactory result to the use of the specific serum.

In conclusion I would point out that the greatest scope for the usefulness of anti-tetanic serum is on the field of battle; and were it my duty to attend wounded men who had fallen in a cavalry charge, I would consider the use of the serum as an essential and necessary part of the treatment of such cases.

A CASE OF "CEPHALIC" OR "HYDROPHOBIC" TETANUS—RECOVERY.

By HENRY CROLY, M.D., B.Ch., Dub. Univ.

[Read in the Section of Surgery, December 10, 1897.]

Case.—Mr. S., while driving his horse and trap, was upset and thrown violently to the ground, sustaining very severe wounds on the right side of the forehead, and was picked up in an unconscious condition. The wounds were dressed, and all went well until the sixth day, when erysipelas set in, accompanied with violent delirium. He recovered from this, but about a fortnight later he noticed one morning that the right side of his face "drooped," had soreness and difficulty in swallowing, stiffness about the jaw, and inability to open his mouth as wide as usual. The following night he was awakened from sleep by severe cramps in the abdomen and legs, his mouth shut with a sudden snap, catching his tongue between his teeth; in this condition his relatives found him and disengaged his tongue by forcing a spoon between his teeth. He complained at times of an excruciating pain, referred to a point midway between the umbilicus and symphysis pubis, and travelling directly backwards to the spine.

When I saw the patient I found him in the following condition:—On the right side of the forehead there were several wounds, in a very unhealthy condition, covered with scabs and retaining beneath a considerable amount of pus. He had paralysis of the seventh nerve on the right side. The left side was in marked contrast to the left, being in a state of tonic contraction; the forehead wrinkled; the palpebral fissure narrowed; the angle of the mouth drawn upwards and onwards, giving to that side of his face the peculiar "tetanic expression." The trapezii and sterno-mastoids stood out prominently; a sulcus existed in the middle line of the neck, bounded on either side by the prominent anterior bellies of the digastrics and genio-hyoids. With the exception of the latissimus dorsi, which was occasionally hard and somewhat painful to the touch, the thorax and upper extremities were not involved. He had marked

opisthotonos. The abdomen was flat and extremely hard, with the recti abdominis standing out prominently on each side of the mesial plane. He suffered from severe exacerbations of the spasms, and during these the lower limbs were violently abducted causing great pain and a feeling—to use his own expression—"as if he were going to divide in two." The urine was normal and passed regularly; the bowels obstinately confined; perspirations profuse; temperature fluctuating between 98·6° and 99·8° F. He took nourishment well.

The case at first somewhat puzzled me. I knew he was suffering from tetanus, but had never seen it associated with facial paralysis; but on consulting Dr. Gowers' work on Nervous Diseases I found he described a case almost identical with mine, which he calls "cephalic" or "hydrophobic" tetanus—"cephalic" on account of its association with extensive head injuries," "hydrophobic" on account of the great soreness about the mouth and difficulty in swallowing. He explains the facial paralysis as reflex from the fifth nerve, which was injured at the time.

I cannot view as satisfactory Dr. Gowers' theory as to the causation of the facial paralysis—namely, that it is reflex from the fifth nerve—as I do not understand what that means; but it seems to me that as the paralysis in this case was of a transient nature, that there are two possible ways in which it might occur. *Firstly*, that the fall which occasioned such severe injuries to the head might have caused a fracture of the petrous portion of the temporal bone, and that the paralysis was due to inflammatory exudation pressing upon the nerve, which became absorbed when the bone united, and so removing the pressure the paralysis ceased. *Secondly*, that the paralysis was due to the action of the tetanus toxine on the facial nuclei; but the paralysis being unilateral, it is improbable that the toxine would act on nucleus and leave the other intact, especially as the facial nuclei are in such close proximity to each other.

Treatment—Locally hot boracic stupes, and subsequently dry dressing; tetanus antitoxin in the form of dried serum was given hypodermically in gramme doses dissolved in two drams of sterilised distilled water once daily; after three days, not finding any improvement, this treatment was discontinued, symptoms in no way abated. Chloral hydrate was now given in drachm doses, night and morning, which certainly did good, relieving the spasms and producing sleep. From this on the patient's condition improved, the spasms getting less and finally ceasing, the facial paralysis disappeared, and the patient made an excellent recovery.

The following discussion took place on the three preceding papers on tetanus:—

Sir W. Thomson said they were accustomed to look at tetanus as essentially consisting of two groups—one acute, and one rather regarded as chronic. The acute cases come on very rapidly, and run fatal courses usually within a few days; but the chronic cases are hopeful, no matter what treatment is adopted.

Mr. Henry Gray Croly related a fatal case of tetanus which occurred last November. The patient was injected with antitoxin. He had tried the antitoxin treatment in more than one case without any benefit whatever. He stated that he had often noticed yawning to be a forerunning symptom of tetanus.

Sir Thornley Stoker said that he had seen Mr. Denham's case of tetanus, and he had no doubt whatever that the antitoxin did diminish, or at times even abolish, the spasms. At the same time the patient died. In the application of antitoxin for tetanus it was impossible to say in a given case whether it was the treatment that cured the patient or not. He related an acute case of tetanus which occurred in a boy aged thirteen, with the most frequent and violent spasms he had ever seen, with one exception. He saw the boy on the sixth day after the injury, and after being treated with the rapid exhibition of mercury, and by what completely allayed the spasms—the inhalation of the vapour of nitrite of amyl—recovery took place. Antitoxin treatment was

only on its trial, and it was, therefore, very important that a great bulk of cases should be recorded.

Mr. Myles said he had met two cases of tetanus. Both cases recovered. In one case he had used antitoxin. Recovery complete. He thought that the gradually-increasing weight of evidence was in favour of antitoxin, and that no man could feel that he had done his duty in a case if he did not at least give the patient a chance.

Mr. M'Causland related a case of tetanus. The patient was struck by the step of a passing car on the legs, and slight wounds were inflicted. He was dressed in Steevens' Hospital and went out. The following day opisthotonos was well marked, and spasms had commenced during the previous night. Under an anæsthetic the skin around the wounds was freely excised, and at the same time an injection of ten c. grammes of French antitoxin was given. At that time he (Mr. M'Causland) gave a very bad prognosis. However, the patient was much better in the evening. A drachm of bromidia every two hours, nourishment, and a large enema were ordered. Only two slight spasms occurred after recovery from the anæsthetic. Recovery was complete in ten days. Mr. M'Causland could not say whether it was the antitoxin or the excision of the skin which had the effect of curing the man.

Sir William Stokes said that he had been deeply impressed by the result of the antitoxin treatment in one of Mr. Patteson's cases.

Mr. G. Jameson Johnston would like to ask Mr. Knox Denham if there was any facial paralysis in his case, because Sir William Gowers thinks that the facial paralysis is always accompanied by some lesion of the fifth nerve. He (Mr. Johnston) thought it was more of a passing neuritis which passed up the facial nerve, which became paralysed by pressure in the canal at the time.

Mr. Lentaigne said he had treated three cases of tetanus with mercury and chloral, and all had recovered, whether as a result of the treatment or not he would not venture to say. He had used the mercury before antitoxin had been discovered, but just after the discovery of the microbic nature of tetanus. He had used it on general principles, and because of its action on the whole system in syphilis and some other affections, all of which were then believed to be probably of microbic origin. The chloral was given in fifteen or twenty grain doses every third hour to relieve spasms, and both drugs were continued so long as any symptoms appeared. The patient was rapidly mercurialised, and then kept under

the influence of the drug by small doses; he also kept hot carbolic and sublimate lotions constantly on, and in the neighbourhood of the wound he used a mixture containing 1 in 40 carbolic acid, and 1 in 1,000 or 2,000 corrosive sublimate. He was himself very doubtful as to the value of the antitoxin as at present manufactured, and so also seemed to be the manufacturers in the Pasteur Institute, as he had lately seen a bottle of serum on the label of which it was written that it was of no use for acute tetanus, and could be of use only in chronic tetanus. He considered that the immediate and efficient application of antiseptics to the wound is most important from a prophylactic point of view.

Professor Bennett drew attention to the fact that Mr. Colles had recommended turpentine as the proper local antiseptic for a tetanus wound.

Dr. Finny remarked on the tendency at the present day to overrate treatment by serum and antitoxin.

Mr. Patteson, replying, said he had employed fluid serum prepared at the Pasteur Institute. Dried serum was also made, and had the advantage of retaining its properties better. In his cases the wounds had been carefully scraped and strongly cauterised, but he did not think that much could be gained by excising the wound where the symptoms had already developed. He said that he would not like to trust to mercury as a treatment for tetanus.

Mr. M'Causland said that in his case the wounds had not been excised till six hours after the symptoms had manifested themselves.

Mr. Knox Denham, replied.

Mr. Henry Croly replied.

CASE OF LEFT SUBCLAVIO-AXILLARY TRAUMATIC ANEURYSM: LIGATION OF SUBCLAVIAN ARTERY IN THE SECOND PART OF ITS COURSE—RECOVERY, WITH PERFECT USE OF ARM.

By HENRY GRAY CROLY, F.R.C.S.;
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Boys' Masonic School;
Past President, 1st Biennial, Royal College of Surgeons.

[Read in the Section of Surgery, January 21, 1898.]

I CONSIDER it my duty to this College, to this Section of the Royal Academy of Medicine, to the hospital to which I have the honour to belong, and to the profession generally, to place on record the first Irish case of ligation of the subclavian artery in the *second* part of its course. The treatment of surgical aneurysms in the past has been ably dealt with in this hall by brilliant and industrious surgeons. The names of Todd, Hutton, Bellingham, and Tufnell are familiar as household words, and the Dublin treatment of aneurysm is known wherever surgery is taught and practised.

History of Case.—Owen O'Neill, aged thirty-seven, present occupation a garden labourer, a strongly-built man, not of temperate habits, naturally healthy, states he never had any serious disease. He was at one time a private in the 102nd Regiment, and served under Lord Wolseley, in Alexandria. In April, 1884, he got a sabre wound on the left parietal bone, which was stated to be fractured. April 29th, 1893, he was in a public-house; some dispute arose, a man rushed at him and stabbed him with a tailor's scissors below the left clavicle, and stabbed him a second time above that bone. The hæmorrhage

was profuse. To use the man's own words, the blood flowed like a fountain. He fell on the floor and became faint and his left arm fell dead at his side. The police were soon on the scene, and O'Neill was conveyed to the City of Dublin Hospital and admitted under Mr. Fitzgibbon, who was accident surgeon for that week. On the patient's admission there was merely an oozing from the wounds, and a large hæmatoma had formed, conical in shape, and almost as large as half a small-sized cocoanut. The patient was placed in bed, and as he was in a state of profound collapse every possible means were em-

ployed to restore him. Compresses and bandages were applied to the wounds. The patient's condition gradually improved. A loud bruit with a distinct pulsation, absence of radial pulse, and powerless condition of arm were noted. Ice-bags were applied to the tumour, and later on shot-bag and Esmarch's bandage were employed, with suitable diet and perfect rest. The arm and hand remained powerless for four months, the ring and little fingers being the last to regain power. The patient always complained of pains in the axilla. Pressure relieved it.

The hæmatoma diminished in size gradually. The pulsation became less forcible, and the man was considered fit for the convalescent home, to which he was admitted November 27th, 1893, nearly seven months from the date of his admission to hospital. He left the home before Christmas, less than a month from admission, and resumed his work. At first he merely led a horse and drove occasionally, and it was not until he commenced the laborious work of pitching manure that the tumour again troubled him. His arm wasted—he suffered from numbness of hand. The axillary pain was constant, he lost sleep and was obliged to give up work. February 15th, 1895, he again sought admission to the hospital, having been 14 months at work.

Condition of Patient on Re-admission to Hospital.—His general health was good. A large pulsating tumour occupies the sub-clavicular axillary space, the shoulder is raised, the upper extremity wasted, a loud systolic sound is heard above and below the clavicle and in the axilla, into which the tumour bulges. Treatment was recommenced—"Tufnell" diet, perfect rest; pressure, iodide potassium, and so matters went on for some months. When Mr. Fitzgibbon resigned his hospital appointment, he handed over his cases to me, and thus O'Neill was transferred to my care. I continued the treatment, and I gave in addition digital pressure a full trial, but it soon failed to control pulsation. The casts which I exhibit to the Society show the extent of the aneurysm. He was most anxious to be cured without operation, and was very patient, but at last gave me permission to perform any operation, except removal of his arm. The case attracted a considerable amount of attention, and in addition to the hospital staff, he was examined by a number of hospital surgeons. My friend, Mr. Ballance, surgeon to St. Thomas's Hospital, London, and joint author with Mr. Edmunds of a work on "Ligature of Arteries in their Continuity," being in Dublin, I asked him to see the patient. He did so, made a most careful examination, and fully agreed with me that the time had come when ligation of the artery in its *second* stage should be performed.

On December 2nd, 1895, I proceeded to operate in the presence of my colleagues and a number of other distinguished surgeons and physicians. The patient was anæsthetised. The arm was steadied by my son, Henry Croly, M.D., B.Ch., and my former

colleague, Dr. Gordon, rendered valuable aid. I commenced by making a vertical incision at the outer edge of the sterno-cleido mastoid muscle. A second horizontal incision was made along the clavicle, almost its entire length—the entire clavicular origin of the sterno-mastoid was divided. When the subclavian triangle was exposed, a large aneurysmal tumour was seen occupying the entire third stage of the artery, the external jugular vein was lying at the outside of the space; the cords of the brachial plexus were not seen; a huge vein like a "gorged leech" was observed parallel with and above the clavicle. I now passed my forefinger along the aneurysm, and felt for the scalenus anticus muscle, the outer border of which was turned backwards by the pressure of the aneurysm. With considerable difficulty I raised the edge of the muscle. The phrenic nerve was seen in its normal position, and when first exposed the patient hiccoughed slightly; with a blunt-pointed scissors I divided nearly one-half of the outer portion of the scalenus anticus. I searched for the subclavian in the bottom of a very deep well, and though the space was clear and there was no bleeding to mask the parts, I found great difficulty in feeling or seeing the vessel. At this stage, which I may term the "halting point," I scraped through the deep fascia, and exposed about a quarter of an inch of the vessel, *which pulsated*. At this moment the cone of the pleura hopped up like the finger of a glove. This fortunately did not recur. I next raised a portion of the sheath in a fine forceps, and made a sufficient opening to allow the passage of the aneurysm needle, which I got made specially with a long deep curve and a large eye. Having steadied the artery with the point of my right forefinger. I passed the needle with my left hand from below and within upwards and slightly outwards; it came under the artery at the first attempt. I then armed the needle with a long ligature made of ox peritoneum, and which was immediately previous to operation steeped in warm solution of carbolic acid. The loop was divided, and the needle withdrawn. I tied the ligature on the side next the heart by the first hitch of a reef knot. The artery grooved like a director. I merely approximated the internal coats, as suggested by Scarpa (1817), and used no violence whatever. The second ligature was applied in the same manner, and finally I drew the *four ends* as a single ligature (holding two in each hand), and thus completing the "stay knot" of Ballance

and Edmunds. I now exhibit the ligature (goldbeaters' skin) on a piece of tubing. The aneurysm needle and the ligature was kindly sent to me by Mr. Ballance, who was most anxious to come over for the operation, but was unavoidably detained. When the first half-hitch was tied, I asked if the pulsation in the tumour had gone, and I was told the aneurysm *ceased to pulsate* (the tumour did not collapse), and that the radial pulse was gone. The advantage in using two ligatures is that a greater length of the intima of opposite sides is brought into contact. The wound, a very deep one, was thoroughly washed out with warm carbolic lotion, and the edges closed with gut sutures. The patient bore the operation well. No small vessels required ligatures or clip forceps, and no director was used at any part of the operation.

With the exception of a slight attack of tonsillitis (which ran up the temperature for a time) the patient made an uninterrupted recovery. It was fully a month before any trace of a radial pulse could be felt; the brachial pulse has *not* returned. The axillary tumour got hard, and lessened gradually; the hand, forearm and arm kept a natural heat: The casts [exhibited] were taken from time to time before and subsequent to operation, and it is very interesting to observe the gradual disappearance of the tumour. I exhibited the patient at the Surgical Section of this Academy, and I also took him to London and exhibited him at the Clinical Society, where the case attracted much interest. The man works as well as he ever did, and suffers no inconvenience whatever. A large artery, evidently the "transversalis colli," can be felt about an inch above the clavicle.

The operation which I performed was originally suggested and practised by Dupuytren in 1819. A man, aged 37, received a sword injury, and a subclavic axillary aneurysm formed. As the tumour encroached upon the third stage, Dupuytren divided the outer border of the scalenus anticus; the artery could be seen, and its pulsations were stopped by finger passed to the bottom of the wound. Triple silk thread used; ligatures removed on the eleventh day; wound

nearly cicatrised. Tumour diminished every day; suppuration feared, and on seventy-eighth day the tumour was reduced to one-fifth of original size. Patient made a perfect recovery.

Liston's case, 1820.—Coachman, aged 35. Left subclavio-axillary aneurysm caused by a fall on the shoulder; second stage of artery tied; outer half of scalenus anticus divided; external jugular vein was cut; secondary hæmor-

rhage from that vessel; tumour gradually reduced in size. Patient made good recovery. Both these cases, like mine, were traumatic, and are the only cases of the kind on record so far as I can discover.

Auchinloss, surgeon, in 1833, to Town's Hospital, Glasgow, published a case of left subclavio-axillary aneurysm of 18 months' standing in a man, aged 65—a weaver by trade; no history of injury. The artery was ligated in its second stage. Considerable difficulty was experienced from the swollen state of the jugular vein, which, being fully twice the size of the thumb, completely overlapped the anterior scalenus. The operation was greatly facilitated by the use of Abraham Colles' metallic retractors or flexible spatulas. The phrenic nerve was held inwards. In the evening the temperature in the axilla was 94 deg. Fahrenheit. The patient was bled profusely. Comatose symptoms supervened and he died apoplectic, 68½ hours after operation.

Post-mortem.—Aorta atheromatous.

Godlee's Case.—A gentleman, aged 66, admitted to University College Hospital, London. The aneurysm projected into the left axilla, and although it was not to be felt above the clavicle, the pulsation in this situation was much more forcible than that on the opposite side. Symptoms existed for two years. No history of injury, or syphilis, or rheumatism. Tufnell's treatment first tried, neither phrenic nerve or thoracic duct were seen, four stands of the finest chromic catgut were employed, reef knot. Mr. Godlee writes to say aortic aneurysm subsequently caused the patient's death.

Cases of ligation of the subclavian artery in the second part of its course for traumatism.

1. Dupuytren, 1819	...	...	Recovery
2. Liston, 1820	...	...	Recovery
3. Croly, 1895 ...	...	...	Recovery

Cases of ligation of the subclavian artery in the second part of its course for disease.

1.	Auchinloss, 1833	... ...	Artery diseased; artery divided; died.
2.	Godlee, 1890	... ...	Recovered operation; died subsequently of aortic aneurysm.

(1.) A short description of the anatomy of the parts involved in the operation I consider important and instructive.

(2.) Dupuytren was the first surgeon and anatomist who divided the subclavian artery into the *three parts*.

(3.) The subclavian artery in the *second* part of its course lies in a remarkable intermuscular space, the scalene triangle, bounded by the scaleni muscles, anticus and medius, and first rib. These muscles are closely approximated to each other at their attachments to the tubercles of the cervical transverse processes; but in descending to their insertions they diverge, leaving between them a triangular space, of which the base placed inferiorly corresponds to the first rib and to a small portion of the second. In this space the artery, brachial plexus and *cone of the pleura* are situated. In front the artery is in contact with the anterior wall of this triangle (scalenus anticus). Behind it is separated from the posterior boundary (scalenus medius) by the summit of the cone of the pleura, which ascends thus high into the interval between the scalenus medius and the subclavian artery. Towards the summit of this "scalene triangle" the nervous cords which constitute the brachial plexus are placed along the convexity of the artery—superior and external to it a fleshy slip (scalenus minimus of Sœmmering) is often found to pass from the scalenus anticus to the lower or costal extremity

of the scalenus posticus. In this course it runs between the roots of the brachial plexus and consequently subdivides into two the scalene space. The *lower* compartment contains the subclavian artery, the cone of the pleura, and the inferior portion of the brachial plexus, constituted by the seventh cervical nerve and the cord resulting from the union of the eighth cervical with the first dorsal nerve; whilst in the *upper* compartment corresponding to the apex of the triangle) the fifth and sixth nerves of the plexus are seen to unite into a single trunk.

On the front of the scalenus anticus and separated by that muscle from the subclavian artery are found most inferiorly the subclavian vein lying on the tendinous insertion of the muscle and under cover of the clavicle in the flaccid condition of the vein. Above the vein the transverse branches of the thyroid axis, supra-scapular, and transversalis colli, the former more inferior, whilst the phrenic nerve descends obliquely inwards towards the tracheal edge of the scalenus anticus and intersects these two arteries by passing between them. Superficial to these important structures is the clavicular origin of the sterno-cleido mastoid muscle. In size, shape, and direction this muscle accurately corresponds to the scalenus anticus, which lies deeper. The separation of the subclavian vein from the subclavian artery in the second part of its course constitutes one of the most remarkable features in its anatomical history. This condition is not, however, constant, for the vein has been found to lie *with* the artery between the scaleni muscles (Blaudin), and in a few other instances the artery has accompanied the vein superficial to both muscles (Quain). The artery has been seen to pass through the scalenus anticus (Quain). The anterior relations of the subclavian artery in its second stage are :—

1. Skin, platysma, fascia.
2. Sterno-cleido mastoid (clavicular portion).

3. Subclavian vein, suprascapular and transverse cervical arteries and veins, phrenic nerve—*single or double.*

4. Scalenus anticus muscle.

The *left* subclavian artery is much less liable to vary in the mode of its origin than the right. In a few instances it is fused into the left carotid, and the vessels arising by a common trunk form a *left arteria innominata.* The *left* subclavian artery in its FIRST stage furnishes the superior intercostal, a branch which on the RIGHT side more frequently arises under cover of the "scalenus anticus" muscle.

The situation in which the branches arise from any large artery is an important consideration in its history, because of the influence which their presence has on the result of an operation for the cure of aneurysm—and considering the shortness of the trunk, the size of the offsets, and the manner of their arrangement on the parent vessel, it may be confidently stated that there is no artery in which the influence alluded to is more considerable than in the subclavian.

In the *second* part of its course the subclavian artery most frequently gives off but a single branch which soon divides into the cervicalis profunda, and superior intercostal arteries. *The left subclavian rarely gives off any branches in the second part of its course.*

The pleura at its apex projects in the form of a *cul-de-sac* through the superior opening of the thorax into the neck, extending from an inch to two inches above the margin of the first rib, and receives the summit of the corresponding lung. This sac is strengthened by a dome-like expansion of fascia derived from that covering the lower part of the scaleni muscles.

The thoracic duct (of Eustachio) mounts into the cervical region in front of the vertebral artery and vein to the level of the seventh cervical vertebra, opposite to which it begins

to form a curve, first forwards and outwards, then downwards and inwards, striding over the subclavian artery to reach the angle of union between the subclavian and internal jugular vein.

The thoracic duct (of Eustachio) and the internal jugular vein cannot be endangered with ordinary care in ligation of the subclavian in the second part of its course.

The scapular anastomosis (which is very perfect) may be likened to the links of a chain, and includes the union of the scapula with the humerus, the humerus with the forearm, and the forearm with the hand.

In conclusion, I beg to return my best thanks to my friends Professors Fraser and Cunningham, and Dr. G. Jameson Johnston, Demonstrator of Anatomy in Trinity College, and now my surgical colleague, for the opportunities afforded me in the dissecting rooms, and my best thanks are also due to Dr. Paul Carton, my former resident pupil, for the beautiful drawings of dissections which I made of the subclavian arteries. My warmest thanks are also given to Dr. Morton Hewitt, House Surgeon; the Surgical Resident Pupils, Mr. William Chapman Croly and Mr. Scribner; Miss Beresford (Lady Superintendent), and Nurses Skelton and Mutton, for the untiring care and kindness shown to the patient, who is in attendance to be examined by the members after the meeting. He is in perfect health, and his left arm is strong, muscular, and useful as before the infliction of the wounds.

Sir W. Thomson remarked that the actual mode of applying the ligature was important, the walls of the vessels not being injured, but only approximated, allowing the irritation to produce entire occlusion and adhesion of the walls.

Sir William Stokes said that the best congratulations were due to Mr. Croly. The result showed that a clot formed at the

situation of the ligature—a thing which some authorities say is impossible. In the operation it was of great importance not to wound the phrenic nerve. He asked Mr. Croly if it were necessary in cases like his to divide any portion of the scalenus anticus muscle in order to take out the vessel in its second stage. He (Sir W. Stokes) had performed the operation several times on the dead body, and found that by drawing to the inside the scalenus anticus, and without any division of the muscular tissue, he could get at the second stage very well, and thought that by this means the phrenic nerve could be avoided. He thought that Mr. Croly's method of passing the aneurysm needle from below upwards and outwards was the best, as, by so doing, the subclavian vein ran least risk of being injured. Some text-books say that the needle should be passed in the opposite direction—from without inwards—in order to avoid including the last cord of the brachial plexus; but he considered the subclavian vein a much more important structure, and that the nerve could be avoided.

Mr. T. E. Gordon considered that the method of applying the ligature was among the most important factors which gave the brilliant result. He thought that it made little difference what the ligature was made of provided it was perfectly sterile; silk was excluded. He had been practically satisfied with the use of catgut boiled in superheated alcohol, a method which did not render the catgut brittle. He had found kangaroo tendon very brittle. He would like to ask Mr. Croly in what way the wounding of the pleura was of such special danger. He was inclined to think that a large number of the fatal cases that have occurred from wounding the pleura were due to want of aseptic precaution.

Mr. M'Causland asked if the scalenus muscle were drawn aside, and if the phrenic nerve were in the position already referred to, would any result follow the traction on the nerve?

Mr. Croly, in reply, said he had always been keen on approximating the coats of an artery by Scarpa's method. There was no case on record of secondary hæmorrhage from any artery in its continuity where Scarpa's method had been adopted. With regard to Sir William Stokes's remarks, he could only say that to have exposed the second stage of the artery without cutting the muscle would have been an utter impossibility. The scalenus anticus could be drawn over in the dead subject. He always attempted to pass the aneurysm needle unarmed. He agreed with Mr. Gordon in his remarks about the ligature.

LITHOLAPAXY IN HYDERABAD, SIND.

By SURGEON-MAJOR BAKER.

[Read in the Section of Surgery, January 21, 1898.]

I BRING to your notice this evening a series of operations, 404 in number, performed by me when acting as Civil Surgeon in Hyderabad, Sind, during the period from 1st February, 1896, to 21st January, 1897, together with 14 lithotomies performed for various reasons during the same period.

I may as well state at once that the practice at Hyderabad is, and has been for some years, to attempt crushing in every case, and only to resort to lithotomy where it is found impossible to perform litholapaxy. Firstly, as to the latter operation, which is now as popular in Hyderabad as the cutting operation is dreaded, it will be noticed on scanning the list I send round, published in the *Lancet* of October 10th, 1896, and of September 11th, 1897, that a very large proportion of the stones are of inconsiderable size—under an ounce in weight.

For this I have to thank the skill and care of my predecessors, Surgeons-Lieut.-Cols. Keith and Henderson, who had by their continued successes given confidence to the native mind, and thereby induced them to bring these cases in for operation on the very earliest appearance of symptoms.

I have been informed by Mr. Freyer that he had a very similar experience, and that the calculi crushed by him in his later series were much smaller than those with what he had at first to deal.

At Hyderabad, which is a very large operating centre, not only for stone, but for other surgical diseases and injuries, the method adopted was a rough and ready one, the patient

in ordinary cases undergoing no preparatory treatment, but being placed on admission there and then upon the table, the bladder examined, and the stone, if one exists, crushed. The urine was never tested before operation, and for all these and doubtless other deficiencies I can only plead that the results have been good.

Patients on arrival, often from long distances, clamoured for immediate operation, and where no obvious contra-indication existed these requests were at once complied with, due regard being given to priority of claim, as I often had as many as from 15 to 20 cases waiting for me on my return from my inspection work in the district.

Personally, I have never performed more than 5 of these operations in one day, nor more than 50 in any one month; but these figures have been exceeded by Keith, who performed 90 litholapaxies in March, 1894, and by Henderson, who tells me in a letter lately received that he done 63 during October, including 7 in one day.

It is superfluous for me to describe the operation, which is well known to you all; but I may perhaps be excused if I mention a few of the lessons that I have myself learnt from the cases now before you. Firstly, it is very seldom necessary, except when introducing the largest canula, to incise the meatus in adults. The largest lithotrite I used (No. 16) passed easily in the vast majority of adult cases. Secondly, you will note that 19 of these operations were performed through a buttonhole from the perineum into the floor of the membranous urethra. These cases were in children with narrow urethræ, and occurred before I had supplied myself with a Weiss No. 5 fenestrated lithotrite, Keegan's pattern. This I found to be a most reliable as well as a beautiful instrument, and I never failed to pass it into the bladder of a child however young. Let me venture to impress on all who undertake the operation the paramount importance of restrict-

ing their crushing operations to the base of the bladder. If an excursion has to be made elsewhere to seize a wandering fragment, be careful when it is seized to withdraw the instrument a little, and elevate the shank before crushing it. This elevation of the shank of the lithotrite is in my experience the secret of safe litholapaxy, and is apt to be neglected by beginners. A small stone in a child or healthy adult should be crushed without the appearance of any blood tinge in the returning fluid when evacuating, and the presence of a continued deep tingeing is in my experience a harbinger of trouble, and often of danger.

I would like to obtain an explanation of a phenomenon I have experienced and shown to others—often, indeed generally, at the end of crushing a small stone, seldom with a large one, and always, as far as my memory goes, with a small lithotrite. It is this—having grasped a small fragment, yet one large enough to call for crushing, I have felt that any persistence in screwing down would result in smashing the lithotrite, much as if I had grasped a piece of the hardest steel; yet I always found that by very slightly altering the axis of the grasp, after having relaxed the screw, the fragment yielded at once. I have thought that this may have to do with the stratification of the fragment and its natural axis cleavage, but can offer no detailed explanation. Now, with your permission, I will mention some of what I may call the tricks of the trade. If a large calculus seems too hard to crush by screwing down without danger to the instrument, maintain the screw tension for a moment, then relax a little and screw down again, and after doing this once or twice the calculus will often break with a loud crack. Again, where you know by experience from passing the lithotrite that the urethra will not admit of the passage of a large evacuator, the most rapid way of dealing with the case is, after having crushed the stone into large-sized fragments, put the lithotrite off the

screw, and pulverise the stone by repeated "tamping," if you understand the expression. Stones can in this way be reduced to very fine powder in a very short time, and this can be done with safety as well as rapidity if the caution already given to keep the shank elevated is attended to. The subtle manipulation of the evacuator and canula at the end of an operation will often obviate the necessity of reintroducing the lithotrite, the erring fragment being fished for, sucked into the canula, and removed—terminating the operation. The evacuator can be thus used for detection of fragments by giving rise to a click. In large soft, though not necessarily heavy, stones the amount of *débris* often calls for its evacuation to prevent the lithotrite being impeded in its work, and to render the detection of the remaining fragments to be crushed more easily effected. In cases of large prostate the French method of turning the blades of the lithotrite downwards, and picking up the fragments is often useful. This, of course, is never called for in the case of children.

Be careful that your exhauster is perfect. Nothing I believe is more dangerous than the injection of air and water into the bladder. It is said to have given rise to rupture of the viscus, and, short of this, must tend to promote bladder sepsis.

You will, doubtless, notice the very short stay of patients in hospital after operation. The rule followed was to operate in the morning, and to discharge the patient either that evening or the following morning where all had been plain sailing, where there was no fever, and where the urine had been freely passed and was clear. This was often necessary for want of accommodation, but the patients were not lost sight of for four or five days, as they attended the hospital daily in the morning for that period.

During my tenure of office in Hyderabad I had five cases of recurrence within eighteen months after operation. Two

of these were cases of my own, in which I had inadvertently left a fragment behind, and the others occurred in persons who had undergone operation during the twelve months preceding my taking charge. Besides this I have met with about half a dozen cases in which the operation had become necessary a second time, but at such a period after the primary operation that it was reasonable to suppose that they were true cases of new calculus formation unconnected with any incompleteness in the first operation. And this is the more probable inasmuch as I have met, still more frequently, with cases of recurrence after a previous lithotomy.

The cases of lithotomy which may be regarded as litholapaxy failures include one case which ought in fairness to be added to the litholapaxy record, and as it resulted fatally it brings the number of deaths up to 5 in 405 cases. This case you will find in the specimens handed round, and in it I expect you will agree with me in thinking that death was determined by the accident of the broken lithotrite. When a lithotrite breaks my practice is to perform lateral lithotomy, and remove the broken fragments and the remaining portions of calculus.

Of the 14 lithotomies 4 were suprapubic, and in these the stones, as you see, were very large. The other calculi or fragments were removed through the perineum and all but one recovered, death in this case being due to profuse hæmorrhage during and immediately after the operation.

It remains to me a question whether in future I would alter this procedure in either of two directions—to wit, in extending the field of the suprapubic operation to stones less than the very largest, or on the other hand to discard the suprapubic operation in favour of what is, I think, erroneously often described as perineal litholapaxy, I mean the operation of crushing the stone by a powerful crusher introduced through a perineal wound—an operation which to my mind

more closely approaches the operation often unintentionally accomplished in attempting a lateral lithotomy upon a large and soft stone which breaks down under the forceps, and has to be removed piecemeal.

This method of operating has the recommendation of Mr. Reginald Harrison, and of Mr. Milton, of Cairo, and although I do not think it can be classed with Keith's operation at all, I have no doubt it is a useful method, and that it may possibly in the future altogether supersede the suprapubic operation.

I confess to a fondness for a dependent drain, and this is very well supplied to the bladder when it is reached by a perineal incision.

Mr. Milton has expressed an opinion that there is no stone too large or too hard to be crushed, and he has devised an instrument with a wider gape than any hitherto used with which to tackle the largest stones. This wider gape is just what I have often desired, but I am not sure whether, in addition to adding to the width of the gape, it would not be necessary at the same time to lengthen the blades so as to render the grasp secure.

Mr. Milton also mentions that he hardly ever in Cairo meets with stone in a patient free from chyluria, and it has struck me as possible that this may render the calculi deposited in a thicker medium somewhat softer and easier to break up.

It must be remembered that fortunately the largest stones are not always by any means the hardest, and in India, working with the No. 16 lithotrite upon a very large stone, I have had recourse to one of two methods, or sometimes to both, when the stone was so large as to put the instrument off the screw. These are (1), to nibble at the edges of the stone, and so reduce it sufficiently in some diameter to permit of its being grasped with the screw in action; and (2), to

put the screw out of gear, grasp the stone, and tap the top of the male blade with a hammer. This, though not altogether free from risk to the lithotrite, is often rapidly successful in breaking the stone, and after a little experience one becomes a very good judge of the amount of force that can be safely used.

Lastly, I must claim the indulgence of an Irish audience for considering briefly, at this end of my paper, the question of the causation of calculus.

In Sind good Mussulmans eat meat whenever they can get it, it being lawful food according to their religion, and good Hindus also eat meat whenever they can get it, though it is not lawful food according to their religion, and I could discover no dietary reason why stone is so much more prevalent amongst the former. But I did notice—and it had been noticed by my predecessors—that, whenever in the course of irrigation developments the water of the Indus was brought within reach of, and was drunk by, the natives, we had thence a crop of stones; and this, I take it, is due to the amount of lime in this water, and to the fact that the lime salt is much less soluble than the soda salt, and hence that though small uric acid calculi might be freely passed by drinkers of other water the growth of these into larger stones was rendered probable in the drinkers of Indus or canal water.

I have not analysed any of the specimens before you, but this will doubtless be done by the University authorities here, to whose Museum I have presented them, and to whom I have the pleasure now to offer the 14 lithotomy specimens which I have handed round, and this will make the collection more complete.

Sir W. Thomson said that they might congratulate themselves on the fact that the work in this particular operation of stone done in India had been mainly done by Irishmen.

Mr. Croly said that the cause of stone was not known. It had

been attributed in Scotland to the porridge. Alluding to recurrence he said that he had taken two stones out of a man's bladder, and took two more in another couple of years from the same man. He had operated on a good many children for stone, and had found that he could get a No. 7 staff into the bladder without any dilatation of the urethra. There were in the museum stones which he thought Surgeon-Major Baker would not be able to crush owing to their hardness. Some books denied that a stone got attached to the coat of the bladder, but he had once to scoop out a stone which was adherent on all sides of the bladder. He asked why the crushing was complicated with the cutting operation. If a cutting operation was going to be done, why not cut out the stone and drain the bladder? Draining of the bladder was now considered a most important point.

Brigade-Surgeon-Lieutenant-Colonel Potter said that he had been a stone-cutter and not a stone-crusher. When in India he had seen four operations for stone in one morning, but never more. He considered litholapaxy to be infinitely superior to lithotomy. He thought that the water of the country had a good deal to do with the frequency of stone, and possibly heredity might also have something to do with it.

Surgeon-Major Baker, replying, said that to Keegan was due the credit of having proved, against a good deal of prejudice, that crushing of stone in children could be carried out satisfactorily. Mr. Freyer had precisely the same proportion of recoveries in his work in London, including adults and children, as he had in India. Weiss's instrument for children was No. 5 in the shank and No. 7 in the bend. His difficulty on hearing of Mr. Keith's operation first had been exactly the same as Mr. Croly's, and he had thought that crushing combined with cutting was wrong. First of all a grooved staff is passed, the urethra opened with a tenotome, a grooved director passed in, then a small female sound, and finally a large one, and a small lithotrite is then easily passed into the bladder. He did not believe that the wound existed for more than an hour after the operation. A single drop of urine never came away afterwards, a fact which he could not explain. Keith gave as an explanation that the opening was valvular. The operation was entirely different from perineal lithotomy, which consisted in making a large wound in the perineum and introducing something like a pair of calipers. He had no doubt that Mr. Croly had met with stones which would defy any lithotrite. He was sure that stones sometimes became adherent to the bladder.

GUNSHOT FRACTURES.

By J. S. M'ARDLE, F.R.C.S.;
Surgeon to St Vincent's Hospital.

[Read in the Section of Surgery, March 4, 1898.]

THE surgery of fractures and dislocations requires revision in the light of modern methods. Our knowledge of the process of repair has advanced much, and enabled us to understand the reasons for variations of conduct on the part of fractures occurring under different conditions, or occurring in individuals of varying types; but a matter of much greater importance, from a surgical standpoint, is the control we can with safety exercise over fractures some time ago supposed to be beyond the reach of surgery. In this, as in most departments of surgery, those who have kept pace with the times have long since given up the expectant in favour of the vigorous and exact methods which now prevail. Intra-capsular fractures of humerus and femur, fractured patella, fracture of the oscalcis or olecranon, and fractures disposed to remain ununited, all come under the category of affections rapidly and certainly cured by surgical intervention.

This is due in great part to our thoroughness in dealing with the products of the original injury, and our insistence on retaining the bones in such apposition that formative material may be undisturbed during the early days of repair. The fear of converting a simple into a compound fracture has long since disappeared from the minds of those who carry out surgery according to modern ideas. We are now so certain of our capacity for protecting the tissues during operative procedures that all the hidden surgery of old has vanished. The subcutaneous suture for hernia, the subcutaneous teno-

tomies, the valvular incision of abscess, the subcutaneous section of veins, all these, with their uncertainty and their high mortality, have given place to methods based on scientific foundations, the outcome of modern research. The change as regards mortality has been in direct proportion to the vigour displayed in making these procedures open and above board.

Referring to this aspect of the subject, Wharton and Curtis, 505 (1898), says:—"In view of the greater safety with which operations can now be undertaken, we think the time is not far distant when it will be considered the proper treatment, in simple fractures with great deformity, or in those in which it is difficult to retain the parts in position after reduction, to cut down upon the fragments and secure primary fixation by the use of sutures."

In no department of bone surgery is this thoroughness more to be encouraged than in the treatment of gunshot wounds involving bone. This is my excuse for troubling this Section of the Academy with this communication. I would now read brief notes of a case bearing on the question, and hope the details may not weary you.

The case to which I desire to allude occupied No. 19 bed in St. Patrick's Ward, St. Vincent's Hospital. Dr. Mackay, of Stepaside, saw this lad, J. S., aged nineteen years, immediately after an accident which took place in the following way:—The lad was trailing a gun (of his own making) after him, holding it by the barrel; something struck the trigger, and the entire of the charge entered the arm above the bend of the elbow, shattering the shaft of the humerus into fragments.

Dr. Mackay immediately put the arm in proper position, arrested hæmorrhage, and brought the patient to St. Vincent's, as he knew operative interference would be necessary. I saw the patient in consultation with Dr. Mackay at 10·30 that

night; we had him put under chloroform at once, the dressings removed, and the limb thoroughly sterilised by washing with soap and water, then ether, and afterwards with warm corrosive sublimate solution, 1–500. The wound was now flushed out with warm corrosive, and introducing my finger through it I ascertained that the charge had passed *en masse* between the brachial artery and the tendon of the biceps. The artery stood out very rigid and quite bare, and to me it seemed strange how it was not torn. My finger passed readily through the fragments of the humerus towards the back of the arm, where embedded in the substance of the triceps I found spread out the contents of the gun. The skin over the back of the arm was sound. I laid the back of the arm freely open by a long vertical incision, which going through the triceps muscle exposed a cavity containing a part of the patient's coat the size of a crown piece, masses of brown paper, and almost an ounce of shot, hardly a pellet of which was normal in shape.

It was strange that so many of the grains were battered into all sorts of figures, many of them being quite flattened. How so much material got through between the artery and tendon without injury to the vessel can only be explained by the complete covering of the shot by the piece of coat and the abundant wad of paper which I extracted. Free flushing of the track of the charge caused most of the debris to come through the posterior aperture which I had made; but, as will be seen from the accompanying radiograph, a few pellets remained behind. A large drainage tube was now inserted through the arm, a loose dressing applied, and the arm fixed on an angular splint, such as I exhibit.

For some time there was copious sero-purulent discharge, and the patient had much pain. Thorough irrigation with warm corrosive sublimate solution, and plugging of the

wound with gauze saturated with a solution of acetate of aluminium soon reduced this, so that healing occurred with fair rapidity. During this process the parts were kept at rest by an L-shaped bracketed splint which was applied to the outer side of the arm and forearm, while a somewhat similar one supported it on the inner side, so that irrigation, dressing, &c., could be carried out without disturbance of the parts injured.

Now the difficulty I had in this case was to keep the parts in apposition; and in order not to disturb them during repair I was obliged to avoid passive or any other motion of the elbow, and so when at last I was satisfied that union was sound, I found the elbow-joint fixed, and so firmly that I feared bony ankylosis, and not wishing to attempt vigorous extension of the arm, fearing to reproduce in part the original fracture, I took this picture, which I think very instructive, and which I found to be of great assistance, as I now had no hesitation in putting the patient under chloroform, and forcibly moving the forearm or the arm.

From this onward passive motion was carried out, and now you see the appearance of the limb, and that the movements are perfectly free.

The lesson to be learned from this case is that, contrary to most of the teaching on the subject, there is a fair prospect of preserving limbs shattered by gunshot accidents if there is no serious disturbance of the blood supply. And the points I would lay stress upon in the treatment of such cases are—

(*a*) The first dressing must be thorough, however collapsed the patient is.

(*b*) That fixation of the limb must be ensured.

(*c*) That before applying the dressings the circulation in the limb should be restored, either by immersion in saline solution at a temperature of 100°–101° F., or irrigation with the same solution at 103°–104°. It

is extraordinary how this local application of heat restores not alone local vitality, but also the general circulation.

(*d*) That all these early procedures be carried out under chloroform, as nothing serves to confirm the patient's depression like watching every move we make. Besides, he cannot well bear solutions at the temperature necessary for the restoration of vitality.

To Dr. Mackay's promptitude is due the favourable result in this case; and to my assistant, Dr. Kennedy, this boy owes a deep debt of gratitude for his unceasing attention during his time in hospital.

The radiograph, which I have shown you, makes clear the position of—(*a*), the pellets we could not extract; (*b*), the situation and extent of the fracture; (*c*), the complete freedom of the elbow-joint; (*d*), the amount of repair material laid down at the seat of fracture.

One word, in conclusion, in reference to the value of hot water in the treatment of such injuries. It cannot be too forcibly accentuated that nothing restores the vitality of a contused part like heat; and when the heat is applied by immersing the limb in saline solution, which (1) raises the temperature, (2) prevents evaporation, and (3) is capable of absorption, one sees within a brief period signs of local and general reaction. This I have frequently demonstrated to my class in cases of stasis in the intestine, and also in cases of strangulation of the omentum, where the slightest change in the vascular condition can be readily observed. Of course you cannot so quickly appreciate the local change when moist heat is applied for external injuries, such as in our case; but the change of pulse, the improvement in aspect, and the rise of general body-heat, which are soon noticeable, afford ample proof of the great value of this treatment. Believe me, the many merits of boiled neutral saline solutions

are yet little understood. When their application becomes more general and methodical much suffering will be avoided, tedious delays in healing prevented, and many valuable lives preserved.

Sir W. Thomson in the course of some remarks, said that in dealing with recent simple fractures by operative methods he would certainly be in favour of such proceeding in cases where the deformity was likely to be very great, or where the use of the limb was likely to be interfered with. He thought it would be perfectly justifiable to cut down on such fractures, and suture them in proper position.

Mr. Tobin thought that the discovery of the X-rays would compel surgeons to be very careful in their setting of fractures. He thought that they would yet be compelled to cut down upon ordinary simple fractures, and unite them by wire suture in a position that would do them credit.

Mr. T. Myles said with regard to the question of exposing the broken ends of bone, and keeping them in position by means of wire, therein, he thought, lay a possibility of error. There was no method, he said, yet devised for keeping the broken ends of a bone in position where the deformity was due to muscular action. The wiring produced limitation of movement, but would not bring the fragments well together. When a fracture was cut down upon there was no guarantee that the angular deformity was corrected, and if wiring were carried out, even then there was no guarantee that union would take place. In an ordinary fracture—say of the leg—he maintained that although the fragments did overlap slightly, for practical purposes it was just as good a leg, and was able to perform all the functions of a leg.

Mr. G. J. Johnston agreed with Mr. M'Ardle in his preliminary treatment of fractures—that was, very rigorous antiseptic treatment, and also as regards chloroform. What was his opinion regarding Mr. Arbuthnot Lane's treatment of wiring fractures? Mr. Lane seemed to recommend, not wire suturing, but screwing the bones together, which he (Mr. Johnston) thought got out of the difficulty as regards subsequent displacement. He (Mr. Johnston) thought the treatment very good for oblique fractures.

Mr. E. H. Bennett thought that all surgeons who abstained

from the use of anæsthetics in the immediate treatment of fractures were well advised. A fracture was reduced with the greatest ease under the anæsthetic; but as the patient comes out of the anæsthetic he struggles just as badly as when going under, especially when the patient had received a recent injury. He related a case where the olecranon was exposed and united by thick silver sutures, but the patient, on coming out of the anæsthetic, burst everything with a movement of the arm.

Mr. Lentaigne related a case of rupture of the extensor muscle of the thigh, where the patient burst the sutures on coming out of the anæsthetic. A second attempt was successful. Much was learned from skiagraphs taken before and after the setting of a fracture. He took it for granted that gunshot fractures should be treated the same as other compound fractures. It was his custom to inject the cavity of the wound with one in twenty carbolic lotion. Afterwards he used sterilised water to wash away the strong poisonous antiseptic introduced; then, a thing which he considered most important, he put the patient up in plaster of Paris, whether compound or simple. In the case of a compound fracture he cut a fenestrum through the plaster immediately, and then cut one through the antiseptic dressings, and got down to the wound; a tampon of gauze was a most essential thing. The use of plaster of Paris absolutely prevented any possibility of injury when the patient was recovering from an anæsthetic. He thought that even formerly it would have been wrong to amputate in Mr. M'Ardle's case, seeing that the artery was untouched. It might have been a different thing if the nerves were destroyed.

Mr. M'Ardle, in reply, said it was sixteen years since he had screwed bone in a case of ununited fracture of the collar-bone. He then utilised two varieties of screw. He now adopted the wire suture always, and had fixed bone with such means even in very strong patients. There was no muscle which could not be temporarily paralysed. For instance, in the leg, if one wished to keep the bone in place, the tendo-Achilles must be cut. In the thigh the hamstring muscles must be cut, and there was no subsequent trouble whatever. In answer to Mr. Johnston, for all bones that overlapped he thought that the screw was preferable where the fracture was oblique. Such, of course, could not be carried out in the case of transverse fractures. As regards Mr. Bennett's remarks about the struggling of a patient after operation, he (Mr. M'Ardle),

after having the patient thoroughly dressed, applied a splint that prevented the action of the intolerant muscles, or he cut through the tendon that was likely to do harm. For instance, in wiring the olecranon he cut the more important fibres of the triceps muscle. This did not interfere with the subsequent usefulness of the arm. The struggling was easily prevented by a preliminary hypodermic injection of morphin, which would begin to act by the time that the operation was over. He thought that raising the heel and flexing the thigh on the abdomen would have prevented the rupture of the extensor of the thigh in Mr. Lentaigne's case.

OSTEOTOMY OF THE FEMUR AS A TREATMENT FOR TUBERCULOUS DISEASE OF THE HIP IN ITS EARLY STAGES.

By R. F. TOBIN, F.R.C.S.I.;
Surgeon to St. Vincent's Hospital, Dublin.

[Read in the Section of Surgery, March 4, 1898.]

A DELICATE boy, aged ten years, the patient just exhibited, was admitted into St. Vincent's Hospital, Dublin, on Jan. 14th, 1898, suffering from well-marked tuberculous disease of the left hip. Flexion, abduction, and apparent shortening were very pronounced. Pain was complained of in the hip and knee. The joint was full and tender and apparently fixed, but under chloroform the head of the bone was movable and could be pressed down into the acetabulum with obliteration of what was a striking feature in the case—undue prominence of the hip. On the 19th I performed an osteotomy of the femur, dividing the bone obliquely from the greater to the lesser trochanter and putting the limb straight. Subsequently to the operation the patient progressed favourably, there being no pain or rise of temperature. Five weeks after the operation the splint was removed. The fracture was found to be firmly united, the limb was in good position, the fulness in the joint was only just perceptible, and there was no pain. Since then he has been going about the wards wearing a Thomas's splint.

I wish also to call attention to three cases which were exhibited before the Section of Surgery of the Royal Academy of Medicine in Ireland last year. As I have published particulars of them I shall content myself with saying that they were all pronounced cases of tuberculous disease of the hip fulfilling conditions to be mentioned presently, that the

patients in all the cases at times varying from six to nine months after operation walked well with straight limbs, and that one of the patients brought a letter from the dispensary medical officer, who had kindly sent him up for inspection, stating that on the day before he despatched him to Dublin the little patient had walked four miles to the consulting-rooms of the dispensary and was also about to walk the four miles back. In addition to these four patients there are two others who have lately gone to their homes in very good condition wearing Thomas's splints. I hope to show them to you before the end of the session. These constitute all the cases I have treated by osteotomy. In every instance complete union of the fracture has taken place within six weeks with—as is generally the case after osteotomies—little or no pain or other disturbance; in every instance the progress of the disease was arrested, as instanced by the subsidence of swelling, and the non-formation of abscess; and in every instance a fairly rapid recovery has ensued, and a straight, useful limb has either resulted or (in very recent cases) promises to result.

On the treatment adopted in these cases I beg to make the following remarks. No surgeon has, I feel sure, treated to their termination many cases of tuberculous disease of the hip—especially hospital cases—by the ordinary means of rest and extension without having often asked himself whether nothing further could be done to arrest the progress of the disease or to expedite the cure. It is unnecessary for me to appeal to statistics to show how tedious, as a rule, is the process of cure in this disease, how frequent is suppuration, and how indifferent is often the result. My discontent with the result of the present methods and certain considerations which I shall presently state induced me some time ago to submit some cases of morbus coxæ in an early stage to osteotomy of the femur on a level with the lesser trochanter. These are the cases referred to above.

I shall briefly state my reason for preferring this plan of treatment to the ordinary one by extension. I ask leave to exclude the question of excision, for, although it is the most thorough of all proceedings, it is, owing to its results, not in favour with many, and space will not permit of its consideration. The cases which I consider suitable for this operation are those in which there are no indications of disintegration of the joint, or of septic abscess, or of the disease being situated in the acetabulum, and in which, with the patient lying on his back and lordosis guarded against, the thigh on the affected side makes an angle of more than 30° with the bed. Given such a case I perform the following operation. I put the patient lying on his sound side with the affected limb drawn well in front of its fellow and supported at its upper third by a moist sand-bag of suitable size and shape. In this position an assistant can by depressing the knee divert all concussion from the joint. Through an incision, of sufficient size to let one see things clearly, an osteotome is made to divide the bone pretty fully excepting a little of its under surface which is fractured. It does so obliquely, from the lower border of the great trochanter to the lesser trochanter. The patient is then turned on his back and while an assistant keeps the spine in contact with the table by fully flexing the sound thigh on the abdomen the affected one is brought down till the posterior surface of the knee is also in contact with the table. To guard against adduction or abduction both limbs are "dressed" (using the word in its military sense) by a straight rod resting on the anterior superior spines of the ilium. If there has been adduction in the case some abduction is introduced in the new position. The wound in the soft parts is partially closed and a gauze aseptic dressing is applied. The limbs are then fixed in a modified Bryant's splint and the patient is placed on a plank bed with a hair mattress.

The advantages I claim for this proceeding over the

ordinary treatment by extension are as follows. It at once puts the joint and the limb in the best position for rest. The position of ease for the joint when inflamed is no doubt that which the component parts assume before other factors, such as the weight of the limb, come to disturb them or which they assume when the capsule is experimentally hyper-distended. For is not the position of greatest distension when a joint is full the position of greatest relaxation when it is empty, and are not relaxation and ease synonymous in the cases under consideration? Now, this position is not one in which the leg is straight, and it is well that the leg should be straight—first, because it is most useful so; and secondly, because when bent it is a drag and worry to the joint. The problem is, How shall we put the leg straight and allow the component parts of the joint to retain the position of ease? This can be done only by an osteotomy.

It is pretty generally assumed, even by surgeons who have to warn their nurses and "residents" against the many devices used by hospital patients to render extension by weight and pulley inoperative, that this extension always means rest. That it relieves pain where there is starting of the limbs we know, that it is better so to steady a flexed limb then to let it lie anyhow we also know, but that it means full rest is another question. Does it mean rest for the ligaments and capsules which are stretched? Does it favour the absorption of fluid or the various processes by which nature effects a cure? No. Take, for instance, adhesions. Does it favour them? There is no one who will not acknowledge that adhesions are often salutary. They limit inflammatory processes and they encapsule irritants, they give fixation to parts to which movement would be harmful. No; turn it how one will, extension by weight and pulley leaves much to be desired.

My next point is that osteotomy brings on the scene a very beneficent factor. This is a question on which I par-

ticularly ask your opinion, for while this factor is for me a threadbare clinical experience, its very existence is, I know, doubted by one eminent authority. Is it or is it not a fact that consequent on the section of bone there occurs in the neighbourhood of the point of section an alteration of the bone's economy which has, as a rule, a salutary effect on any tuberculous inflammation there existing? I say it is a fact. An occasion on which I saw this strikingly manifested was one where I proceeded to excise a knee in a case of long-standing tuberculous disease without having got leave from the patient to perform an amputation should occasion require it. As soon as I had removed the articular surfaces I found that the disease extended so far in both bones that its removal would have made union impossible. I therefore contented myself with approximating and fixing the parts. Without further surgical interferences, these bones, in which for years a rarefying osteitis had been advancing, and in which prior to operation there had been apparently no efforts at repair, healed thoroughly and made for the patient a useful limb. But why weary the reader with every-day incidents?

On the fact which they teach—viz., that tuberculous bone tends to mend after being incised—Kirkpatrick, Stoker, Stokes, and MacNamara have founded methods of treatment which have yielded good results. Almost my first experience of the Royal Academy of Medicine in Ireland was a discussion in the Section of Surgery on this subject raised by interesting papers from Sir Thornley Stoker and Sir William Stokes. On that occasion the Section was almost unanimous in agreeing with their views. For myself I am in entire agreement with them, and I have followed their advice in more than one case with good results. It is, however, a question how incision or resection of bone does its beneficient work. Some say by the drainage it affords. The explanation which occurs to me is rather something of

this sort. Under ordinary circumstances there is in tuberculous bone little or no tendency to bony reparation, one sees no osteophytes thrown out or other indications of reactive vitality. Resection of the bone excites this vitality. It calls upon it to put forth its whole strength for the repair of the injury. There is a new *régime* before which the tubercle process has to yield—a *régime* which in the case of a fracture passing from the great to the lesser trochanter must extend somewhat to the neck and head of the femur. Is it not the case that in examining a specimen of recently united fracture in any bone one sees a more or less sclerosed area extending well beyond the scene of injury, and that this condition is the very reverse of that which one meets with in spreading tuberculous disease? Anyhow, whatever the explanation, the clinical fact remains and the osteotomy I suggest gives a large number of patients with tuberculous hips the benefit of it, since most observers are in agreement that in the hip the usual situation of primary trouble is at the lower part of the neck of the femur just outside the epiphysial cartilage.

The most serious objection which I have seen urged against this plan of treatment is by Mr. Owen in the "Year-book of Treatment," to the effect that either non-union will follow the osteotomy or that union will take place at such an angle that the inevitable shortening becomes greatly intensified. With these objections experience must deal. As yet it is altogether favourable to the operation, but of course six cases are too few to prove anything. It should, in considering the danger of non-union, be remembered that after straightening the limb the fragments still in apposition are not further disturbed, the soft parts are not torn, and the limb is at once placed in a splint. The same consideration—*i.e.*, the fact that the force which breaks the bone does not displace the fragments—taken in conjunction with the shortness of the upper fragment, will explain the very

slight degree of shortening which has as yet occurred in these cases. As regards treatment, when the patient is up and about I hold by Thomas's splint. I use it from the outset with patients who present themselves early, for it is easily fitted to a fairly straight limb, but for straightening a flexed and adducted limb I prefer an osteotomy. The a flexed and abducted limb I prefer an osteotomy. The splint should be worn for a considerable time. No treatment can give quickly to a diseased hip the strength necessary to bear the weight of the body. One way may be less slow than another, but all must be slow. A want of consideration of this point may cause new methods to be unjustly tried. It should not, however, make the surgeon rest content with things as they are. No one will convince me that the treatment of hip-joint disease has reached its highest development. Its present position is one calling loudly for the attention of the general surgeon, for since the surgeon cannot in general hospitals detain hip cases as long as is desirable it is specially incumbent on him to do as much as possible for them during the period of their stay, and to discharge them in as forward a state as possible.

Mr. T. Myles was afraid that he could not go with Mr. Tobin in his hopes regarding his treatment. The conversion of a disease of the hip-joint with tubercle into a compound fracture, without any attempt to eradicate the tuberculous focus, seemed to him to be very bad. He recently tried an osteotomy in a case of ankylosis immediately below the great trochanter with a fatal result. When the femur is divided at the trochanter, and the lower segment of the limb brought down to its normal position, there must be a great pressure exerted on the tissues in front of the upper segment, causing awful pain. He had operated on a case, and had no hesitation in saying that death was caused by the awful pain subsequent to the operation. If the deformity in the early stage of the disease happened to be rigid, any attempt to produce the position advocated

by Mr. Tobin would, he was afraid, produce a result similar to that he had described. He thought that Mr. Tobin was wrong in assuming that when he had divided the neck of the femur and put the rest of the limb straight, he had left the upper segment intact. From his own early experience he was convinced that excision of the hip was hopeless in the late stages. He had opened a good many hips in the early stages, and never found much fluid in the joint, and was convinced that, whatever be the deformity, it was not due to distension of the joint with fluid. He thought that the deformity was caused by the mechanical preponderance of the muscles in front overcoming the muscles behind. He agreed with Mr. Tobin on operative interference on the bone, and thought that Sir Thornley Stoker's and Sir William Stokes's method of trephining the great trochanter gave the best promise of a successful issue. He believed that in nine cases out of ten rest and gradual treatment with the pulley, and afterwards with a Thomas's splint, would end with a useful limb. Trephining of the great trochanter might be recommended in more obstinate cases.

Mr. Lentaigne said he had performed excision of the hip pretty often of late, and, with two exceptions, had had favourable results. He thought that Mr. Tobin's method was a very bold procedure. He had seen two or three of his recent cases, and thought it was a question altogether of how those cases would get on during the next year or so. If the patients were then in good health comparatively, and if the hip disease had disappeared, he said that there was a future for the operation, which was a simple and an easy one.

Mr. M'Ardle said that he had seen Mr. Tobin's results, and thought them more remediable than his own. He thought Mr. Tobin's procedure one which was well worthy of being carried out. In the replacement of the limb he had not observed that there was any difficulty such as that experienced by Mr. Myles. There was a quietude obtained for the patient after the operation, such as was obtained by no other method.

Mr. T. E. Gordon said that Mr. Tobin's statement that extension of the limb caused stretching of the ligaments of the joint was surely contrary to the general pathological teaching in connection with the surgery of joints. In order to cause stretching of the ligaments, one would have to cause separation of the bones. He had seen experiments made to try what weight was required to effect separation of the bones, and it was something enormous. It

was, therefore, impossible that the ordinary extension could cause any stretching of the ligaments of the joint.

Mr. Tobin, replying, said he had not such fear of producing compound fracture as Mr. Myles had. Did Mr. Myles mean to maintain that osteotomy of the femur was a very dangerous proceeding? Regarding his statement that the lower end of the upper fragment must be pressed down by the tissues, and that he (Mr. Tobin) did not get the result he hoped, the patient just exhibited showed that the upper fragment was united to the lower at an oblique angle, and the photograph of the limb before the setting right of the condition showed clearly that its angle which the upper fragment retained was exactly its angle prior to the operation. He again remarked that, whatever the cause of the displacement in a case in which distension of the joint existed, straightening would increase the tension and cause harm. Regarding Mr. Gordon's remarks, he (Mr. Tobin) said he had noticed that a weight applied for a short time produced no result; but the continual application caused extension. Also, when the muscles were tired the weight must pull on something, presumably on the ligaments and capsule, and diseased tissues around the joint, and by so doing it did not create for the diseased parts a position of ease.

ON INTESTINAL OBSTRUCTION FROM MALIGNANT DISEASE OF LARGE INTESTINE, WITH NOTE OF A CASE OF SUCCESSFUL RESECTION OF COLON FOR CANCER.

By JOHN LENTAIGNE, F.R.C.S.I.;
Surgeon to the Mater Misericordiæ Hospital.

[Read in the Section of Surgery, April 1, 1898].

In the treatment of cases of intestinal obstruction, the surgeon should have in view the attainment of two definite results, of which the first and most pressing is the relief of the obstruction itself, and the second is the radical cure or removal of the condition which has produced the obstruction, I believe that by systematically separating the procedures necessary for attaining these ends, and by carrying them out in a certain definite way which I am about to describe, a maximum of success is likely to be attained. This principle, but by a different method, is recommended by the late Mr. Greig Smith, in the last edition of his work on Abdominal Surgery. The method he advocates is carried out in three stages, as follows:—

1st. Fixation of diseased tract outside abdomen.

2nd. Intestinal drainage.

3rd. Resection of diseased gut outside abdomen with subsequent cure of artificial anus.

The method which I am about to describe is, I think, simpler and safer than his.

In cases of obstruction from malignant disease of the large intestine it is particularly applicable, and in the three cases which I am about to detail it was applied systematically with, I believe, the best possible results that the morbid conditions present and the circumstances or whims of the patient would allow of.

The procedure adopted by me, and first practised in 1892, consists of the following steps:—

1st. An exploratory laparotomy, the incision to be made in the most suitable place; the abdomen to be rapidly explored, and the cause of disease ascertained as far as possible; great care should be taken to displace the parts as little as possible, and to avoid undue traction. If the exploration reveals a possibility of permanent cure, and if there be no special contra-indication, such as gangrene or perforation, the second step—*i.e.*, the formation of a fæcal fistula (if possible by two stages) at some point above the seat of obstruction—is effected, the fistula to be at the side of the abdomen opposite to the seat of disease.

3rd. When the patient has recovered completely from the operation—*i.e.*, after two or three weeks, but not later than five or six weeks—an operation for radical cure—*i.e.*, resection of cancer, &c.—is to be performed.

The incision for the last operation will be on the opposite side of the abdomen to that on which the fistula opens.

A layer of celloidin over a continuous catgut suture is particularly suited for closing the wound in this last operation, and it adds greatly to the safety of the patient by presenting a watertight and impermeable barrier to fæces or any other dirty matter that may be near it.

Case I.—Mrs. G., widow, aged 62, was admitted to the Mater Misericordiæ Hospital, suffering from intestinal obstruction, on April 25th, 1892. She was collapsed, vomiting frequently, and especially when given any food or fluid, the tongue was dry and brown, pulse fast, weak, and compressible. She was not suffering much pain. I was told that she had been freely dosed with morphia before admission. The abdomen was greatly distended and was tympanitic. The bowels had not acted in any way for three weeks. Examination of her rectum showed the condition called ballooning, and at the tip of the fingers with great effort a freely movable soft mass could just barely be detected.

History.—Patient said that while taking tea over a fortnight

before she felt a sudden severe pain in the abdomen; she vomited then and several times afterwards. These symptoms were relieved by morphia. She remained very ill for two weeks, when she vomited matter noticed by her to be lumpy, and which bore a decided fæcal odour.

I at once performed laparotomy. As it was plain from the symptoms that the obstruction must be somewhere in the large intestine, and probably low down in it, I made my incision over the cæcum, which was found to be greatly distended. I did not make as thorough and systematic an examination in this case as in the following ones, but I ascertained that there was a large mobile mass, probably cancerous, at the lower part of the sigmoid flexure. I then stitched the cæcum to the lips of portion of the wound in the parietal peritoneum and overlying fascia, inverting the skin to the bowel by three or four sutures through skin, muscle, and peritoneum over it, and I closed the ends of the skin wound with silkworm-gut sutures. The operation lasted 17 minutes in all. Three days after I opened the bowel by making a vertical incision fully two inches long in the cæcum. This incision was not felt by the patient, although no anæsthetic was employed. An enormous quantity of semi-fluid fæces flowed slowly out, several large basins being filled. The patient felt great relief almost at once. Subsequently I introduced the glass tube of an irrigator and washed out the cavity of the bowel, a further large quantity of fæces coming away. To my great surprise on May 4th, eleven days after operation, a slight motion was passed per anum, next day another motion came, and the bowels resumed their functions, acting every day without purgatives. As the bowels acted normally the fistula rapidly closed, and after some weeks the patient left the hospital declaring herself quite well, and refusing to allow any attempt at radical cure. Before she left, however, a careful examination was made, and no trace of the tumour previously mentioned could be felt, either from the rectum or through the abdominal wall.

Mrs. G. came back to me nine months afterwards; the fistula had then reopened, and the bowels were emptying themselves through it; large irregular masses of cancer could be easily felt through the abdominal wall in the left side of abdomen. The case was then evidently past all possibility of radical cure. This patient died thirteen months after the operation.

Case II.—Mrs. D., sent to me by Dr. Gerald Mitchell, of Templemore, suffering from intestinal obstruction, was admitted to the Private Hospital, Eccles-street, on December 20th, 1895.

State on Admission.—Patient presented well-marked symptoms of obstruction. She was constantly vomiting, mostly a semi-fluid matter, coffee ground in colour, with distinct fæcal odour; the tongue was furred, her abdomen greatly distended and tympanitic; no special tumour of any kind could be found. The symptoms had lasted about 10 days, and had come on quite suddenly, although there was a history of previous attacks of constipation and dyspepsia, for which she had undergone treatment at the hands of, I think, thirteen eminent physicians or surgeons. Assisted by my colleague, Mr. P. J. Hayes, I at once performed exploratory laparotomy. Here again, from the symptoms, I was able to guess that the source of disease would probably be found in or about the left side of the abdomen. I therefore made my incision, as before, directly over the cæcum. I introduced my hand and subsequently my forearm into the abdominal cavity, slowly and cautiously feeling my way along the large intestine until I reached the sigmoid, where I felt a hard mass freely movable and about the size of a goose's egg. I then stitched the cæcum to the edges of the wound on the parietal peritoneum and fascia, and after inverting the skin and dressing the wound, put the patient back to bed. Next day, as the condition of the patient was critical, I opened the intestine without using any anæsthetic. A large quantity of liquid fæces came away at once. After a few days' delay, so as to allow of the toughening of the adhesions, I washed out the bowel through the fistula, irrigating thoroughly with warm boiled water. This procedure was repeated on several occasions subsequently. On the seventh day after the operation a small motion was passed per anum, and frequently afterwards (nearly every day) a small quantity of fæces came away naturally, the great bulk of the fæces coming, however, through the fistula.

After some weeks the patient went home to arrange her affairs before undergoing the operation for radical cure. She stayed away much too long, only returning late in April, 1896, and on April 25th, 1896, I performed the operation of resection of the cancerous mass, followed by end to end anastomosis by two rows of continuous silk sutures, after the method recommended by Prof. Kocher. The incision was made on the left side as far away from the fistula as possible. I then closed the abdomen, using three rows of

sutures, the deepest of fine silk for the peritoneum, the next of stout silk, uniting the muscles and the fascia, and the third of cat-gut for the skin. A layer of celloidin was painted over the line of incision and no other dressing was employed, except a loose pad to protect the surface from contact with the bedclothes, or the fæces which was constantly issuing from the fistula on the opposite side of the abdomen. The celloidin-covered wound was inspected every second day, and one or two fresh layers were applied over it during the course of healing.

The tumour was examined by Dr. McWeeney, and pronounced to be adeno-carcinoma. The specimen was subsequently exhibited at a meeting of the Surgical Section here.

Recovery was quite uneventful, the bowels acted naturally on the fourth day, and nearly every day after. Every day a smaller quantity of fæces was noticed to come through the fistula, and at the end of three weeks nothing but a little mucus would be found on the pad after 24 hours. The patient returned home and has remained in perfect health ever since, the fistula having closed of itself within three months of the performance of the operation.

As almost two years have now elapsed since the removal of the cancer, and as the patient is in perfect health, in marked contrast with her condition for some considerable time before the operation, there is reason to hope that she may have been completely cured.

Case III.—The third case was admitted into hospital on June 16th, 1897, with well-marked symptoms of intestinal obstruction. Exploratory laparotomy was performed on June 16th; the incision, as in the previous cases, for similar reasons, being made over the cæcum, the seat of disease was again found to be at the sigmoid flexure, at its lower end.

The tumour was movable, but not so much as in the previous case. A cæcal fistula was made in two stages as in the other cases, and shortly after the patient left hospital, the bowels acting freely through the fistula. I directed her to return to have the radical operation performed later on, but for one reason or another she did not return until February, 1898, eight months after the original operation. I felt that it was then altogether too late, but as she was very anxious to have the attempt made, I opened the abdomen on the left side and examined the viscera. As I had feared the cancer had spread far and wide,

the glands were extensively involved, and it was quite impossible to remove the disease. I therefore closed the abdomen in the same way as in the other cases. The wound healed at once, and after a fortnight the patient left hospital, the bowels acting as usual through the fistula. She was no better for the last operation, but neither was she any worse, and I can only regret that I had not an opportunity of performing it earlier, when a cure might have been effected.

I found in these three cases that a fæcal fistula in the cæcum could relieve a patient just as effectually as an artificial anus, and with far less discomfort. As might be expected in this situation, there never was any tendency to prolapse or even protrusion of gut, nor was there the atrophy of the bowel below the fistula, such as we see results in cases of artificial anus; consequently the bowel was in the most satisfactory state possible for resection, which also could be done under the most favourable conditions, as the fact that the bowels were emptying themselves freely through the fistula all the time that the wound was healing prevented the irritation and strain on the sutures which would naturally occur when the total contents of the bowel, whatever they might be, were passing over the sutured parts.

Lastly, no operation was required to close the fistula, which in each case closed of itself as soon as the natural action of the bowels was re-established. More remarkable still is the fact that in one case (the first) the fistula closed of itself when the bowels acted naturally, and nearly six months after it re-opened of itself, when the growth of the cancer had again blocked the passage below it.

In each of these cases I was able to decide that the seat of the disease was on the left side, and therefore I made my first incision on the right side, adopting Mr. Harrison Cripps' incision—*i.e.*, taking a line from the anterior superior spine to the umbilicus, the middle of the incision crosses this at a point 1½ inches inside of anterior superior spine.

I was quite prepared, however, in case I should find the disease to be in the cæcum or anywhere on the right side of the abdomen to cut down, on the left side, on my hand inserted in the abdomen, and then to attach the ilium to the edges of this fresh incision. I would then make my fistula there, completely closing the incision in the right side in the ordinary way. In cases of doubt, and where there is no indication as to where the seat of disease is, it is of course advisable to make the primary incision in the middle line, but in such cases the fistula should be made at the side, in order to allow of the safe extirpation of the disease on the opposite side later on, the incision in the middle line being securely and completely closed. Undoubtedly the middle line incision affords greater facility for examining the viscera; but it is an advantage to dispense with it if possible, as sufficient examination can generally be made through the lateral opening. There seems also to be less tendency to protrusion of the distended bowels through the lateral opening. Where extreme distension of the bowels is met with a temporary enterotomy with emptying of the bowels and closure of the opening, should be performed, but I did not find this measure necessary in any of these three cases. I usually insert two loops of black silk as guide sutures in the centre of the exposed gut so as to facilitate the subsequent incision into the intestine.

I would also wish to emphasise the point that if in the primary or exploratory laparotomy any condition such as gangrene or perforation were found, this procedure should not be adopted; an immediate resection of the gangrenous or ulcerated parts, or else a resection in three stages with intestinal drainage such as Mr. Greig Smith has recommended, and careful cleansing of the abdominal cavity with gauze packing should be substituted. Perforation is not uncommon in malignant disease, and may easily be the determining

factor in the production of the attack of obstruction; it is always accompanied by some peritonitis and fœtid exudation. I would also add that it is my intention in future to be very positive and peremptory with my patients in insisting on the operation for radical cure within a few weeks after the relief of the obstruction; as when they are relieved from the miseries of obstruction they are often anxious to postpone and avoid further interference until too late. It is far kinder to them to strongly recommend and urge the radical cure than to wait until such is impossible, when they invariably return begging for aid that cannot then be given them; moreover, I believe that the presence of the open fistula makes this operation much less dangerous than it would otherwise be.

In trans-sacral or abdominal excision of the rectum a freely acting cæcal fistula might, I think, considerably diminish the dangers of the operation.

Since reading this paper I have successfully excised the cæcum by the above method, the intestinal fistula being made on the left side. I would like to add that quite recently I have been informed that Mrs. D., from whom the cancer of sigmoid flexure was removed, remains in perfect health now two years and six months after the operation.

A CASE OF HÆMORRHAGIC INFARCTION OF THE SMALL INTESTINE; SUCCESSFUL RESECTION.

By T. E. GORDON, M.B., F.R.C.S.I.;
Surgeon to the Adelaide Hospital.

[Read in the Section of Surgery, April 1, 1898.]

THE history of the following case seems to me to possess sufficient clinical and pathological interest to justify my bringing it before you: —

CASE.—The patient is a woman about forty-five years of age. She gave me a tolerably clear history of secondary syphilis, contracted some eight or ten years ago, and she has now undoubted evidence of tertiary syphilitic ulceration of the hard and soft palate.

In November, 1896, she was operated on by Mr. Scott for strangulated femoral hernia on the right side, and she made a complete recovery. Her health continued good until the day before her re-admission.

On the morning of that day—*i.e.*, August 17th—she was feeling as well as usual and her bowels were moved. While she was having her lunch at 12 o'clock, she got a sudden and most severe griping pain in the lower part of the abdomen. She was carried to bed and Dr. Woods, of Amiens-street, sent for, who gave her morphia when he arrived. At about five o'clock on the next morning, the 18th, she commenced to vomit, and this symptom persisted until the time of admission. The bowels were not moved subsequent to the attack of pain. She was sent at once to the Adelaide Hospital, and placed under my care, in Mr. Scott's absence.

When I saw her she appeared to be very ill but not collapsed. The abdomen was not distended and was sufficiently flaccid to enable me easily to detect a tumour in the right iliac region, apparently formed by a distended coil of intestine. Dr. Peacocke saw the patient with me, and both he and I thought the case one for immediate operation. We supposed that there existed some form of mechanical obstruction; I accordingly operated and was assisted by Dr. Smyly.

On opening the abdomen, in the middle line below the umbilicus, a considerable amount of blood-stained fluid escaped, and a distended coil of very dark bowel presented in the wound. The peritoneum had not lost its polish, and indeed there were none of the unequivocal signs of gangrene present. There seemed to be a constriction at the upper end of the loop, and this marked off the darkened region very abruptly; below the transition to normal intestine was more gradual. The wall felt thickened and emitted a heavy but not offensive odour. In the mesentery I found a continuation over a limited area of the same condition. I decided to resect and establish end to end anastomosis. I used for the latter purpose Mr. Ball's bobbin of the smallest size I could obtain, and fixed the ends of the intestine into the groove with purse-string sutures. Over this I applied a continuous sub-serous suture of fine silk. For reasons already indicated I removed a considerable area of mesentery. Finally, I sponged out any fluid in the neighbourhood, and closed the abdominal wound.

The amount of bowel removed measured two feet. It was found to contain a mass of foul-smelling blood-clot. The wall was much thickened, and the constriction at the upper end proved more apparent than real. There was no stricture and no ulceration of the mucous membrane.

I did not discover any definite cause for the condition found. It is worth noting that some vessels in the mesentery bled freely as they were divided, and one of considerable size was cut, which may have been, in part, responsible for a complication which I must now refer to.

On the third day after the operation, at 6 30 a.m., the patient complained of the most intense pain in the abdomen. The house-surgeon gave one-sixth of a grain of morphia, which relieved her, and when I arrived she did not appear to be in any great degree of danger. With the attack of pain a slight fall of temperature occurred, and the pulse was 128. By the 22nd, the fifth day since operation, the temperature reached normal, and the course of the case until the 27th seemed to promise an uninterrupted recovery. On that date I found, on removing the dressings, that a considerable leakage of intestinal fluid had taken place. I opened up the wound to some extent and packed with iodoform gauze. A couple of days later (the 29th) a slough came away which seemed to represent the entire line of union, and contained a considerable length of both sutures, super-

ficial and deep. Up to this time the bowels had not been moved satisfactorily, but there was clearly no obstruction, nor was there evidence of other than a purely local peritonitis. On the 30th I ordered a castor-oil enema, which acted well. The discharge of bile-stained fluid was now so great as to necessitate very frequent change of dressings—on two occasions nine times in the twenty-four hours. On September 5th the patient passed a natural motion and the discharge from the wound was reduced to very little, and had ceased entirely on the following day. It recurred to a very slight extent a few days later—a mere soiling of the plugging, before it finally ceased—*i.e.*, ten days after the discharge was first observed and about three weeks from the date of operation.

The subsequent history has been uneventful, and the patient now appears in perfect health.

Remarks.—It is scarcely possible to form any definite opinion concerning the cause of sloughing at the suture line. The possible influence of the division of the mesentery I have already alluded to. It may, however, have been due to an extension of the pre-existing local condition, and the accident might have been avoided by a more liberal resection. Or, again, the flange of the bobbin may have exerted undue pressure on the wall of the gut as it passed over it. This would have been avoided by using a smaller tube.

With some hesitation I have arrived at the conclusion that this case was one of hæmorrhagic infarction of the intestine dependent upon a sudden obstruction of some branch of the superior mesenteric vessels.

The condition might conceivably have been due to:—

1. Inflammation. This we can certainly exclude, for it is impossible that such a violently acute inflammation could have remained so distinctly local. The onset, too, was more sudden than could be explained on this hypothesis, and finally there was no cause found for such inflammation—no bacteria or very few—and the microscopic appearances were not those of inflammation.

2. Some of the usual causes of intestinal obstruction.

None of these were to be seen at the operation, and the appearance of the involved segment of gut was not such as one would expect to find if the cause had been, let us say, a peritoneal band. Had such been present, though overlooked, surely the delimitation of the area of strangulation would have been as marked at the one extremity as the other; and this, as we have seen, was certainly not the case. There were no evidences of previous inflammation about the hernial orifices.

3. If it is allowed that none of these extrinsic causes were at work, it follows that the cause of obstructed circulation must be looked for within the vessels themselves—must, in fact, have been either embolism or thrombosis.

The possibility of the occurrence of an infarction as the result of occlusion of the superior mesenteric vessels seems at first sight very difficult to admit. One is accustomed to find such a lesion in areas supplied by terminal arteries only. Experiments, however, as well as numerous recorded cases of intestinal infarct, place the possibility beyond doubt. The subject is dealt with in Ziegler's "Pathology," as well as by Cohnheim in a most important and convincing essay, by Coats and others. I will quote a few passages of special interest from the last-named pathologist. He writes:—"It has been said that the hæmorrhagic infarction forms in the case of end arteries, but there is an apparent exception to this in the case of the superior mesenteric artery. If the superior mesenteric artery or one of its larger branches be obstructed, hæmorrhage occurs in the intestine and mesentery, and the portion of gut suffers necrosis; but it is well known that the anastomosis of the mesenteric arteries is tolerably free. The explanation of this apparent anomaly has been worked out by Cohnheim and his pupils in a very interesting manner. As a rule, it may be said that main stems have, in proportion to their size, much less considerable anastomotic communications than the smaller branches.

If the main stem be obstructed, therefore, the restoration of the circulation occurs much more slowly than when a small stem is the seat of obstruction. In the case of the superior mesenteric and its larger branches obstruction is slowly recovered from, and for a time the circulation is virtually at a standstill.

"But here a very important element comes into consideration. The vessels of all parts of the body are not equally resistant. Those of the skin and muscles are peculiarly resistant, and are able to stand a considerably prolonged deprivation of blood. It is different with those of the intestines." The author then proceeds to describe an experiment made to test the vulnerability of the intestinal vessels. The conclusion drawn from this is that "before the anastomosis can be established, the backward flow from the veins has already begun, and even the diapedesis. The re-establishment of the circulation even increases the tendency to hæmorrhage, as it subjects the blood to a higher pressure than that of venous blood. The experiments referred to showed that when the superior mesenteric artery is obstructed the hæmorrhage infarction forms with a backward flow from the veins just as in other cases."

I must allow that it is more difficult to explain an infarction limited to a single loop of intestine than the occurrence of a more extensive lesion; for it seems necessary to assume that the obstruction which produces the less effect is situated in a part of the superior mesenteric distribution where the collateral circulation is extremely free. It is possible, however, that this may be explained by supposing that when one vessel had become occluded a rapid extension of thrombotic occlusion follows along the alterative blood circuits. This would be less difficult to assume possible if it could be shown that the vessels of the area were atheromatous or otherwise abnormal. I will have something to say with reference to this point presently.

To conclude this part of my subject I may add that the appearances in my case, both macroscopic and microscopic were such as one would expect to meet with in a case of sudden vascular occlusion. Thus there was considerable hæmorrhage into the peritoneal cavity; the coil itself was full of foul-smelling blood-clots, and microscopic examination showed that the wall of the intestine was everywhere occupied by extravasated blood.

Although cases of hæmorrhagic infarction of the intestine are uncommon, I have found records of a considerable number. Osler, for instance, has recorded three which have occurred in his own practice. Most of the cases have been, as one would expect, associated with heart disease, but different causes have operated in others. Ulceration of the duodenum appeared to be the primary lesion in one instance, and aneurysm of the superior mesenteric artery caused infarction in one of Osler's cases. In the present case two important questions naturally suggest themselves. Could the lesion be, in any way, traced to the syphilis, and did the strangulated hernia take any part in its causation? Syphilitic arteritis is a well-recognised pathological condition and although most writers on the subject deal almost exclusively with it as it affects the cerebral vessels, there can, I think, be little doubt that any artery may show similar changes. This is rendered probably by *à priori* reasoning and more than probable by the record of numerous cases of endarteritis in vessels other than cerebral in syphilitic subjects. Instances of its occurrences in those whose age is much below that at which arterial disease from other causes usually takes place are of special importance. There is then nothing improbable in the supposition that this case may have been one dependent on arterial thrombosis in syphilitic vessels. Moreover, cases have been reported of mesenteric thrombosis stated to be of a syphilitic nature.

As regards the second question, it is worth noting that the

damaged coil lay in the right iliac region, and the previous strangulation had been on the same side. It is, too, of interest in this connection to recall to mind Mr. Hutchinson's statement that "In almost all" (tertiary affections) "we see good reason to believe that in addition to the syphilitic taint some localising influence takes an important share in evoking the local changes." Is it not just possible that the strangulation may have acted in this instance as such an influence and determined the occurrence of the syphilitic arteritis in this particular region?

The extent of intestine involved may range from a few inches to almost the entire length of the small intestine, as in a case recorded by Dr. Frederick Taylor, and I have seen a report of one case in which three distinct infarctions had taken place.

The disease is very generally fatal, but, it is supposed, not necessarily so in all cases. A case of Gull's is quoted in proof of this. In this patient copious hæmorrhage at the outset with subsequent passage per rectum of long sloughs of mucous membrane, together with a preceding œdema of the arm of supposed syphilitic origin, were the signs relied on in making the diagnosis.

The symptoms are, as one would expect, very variable. Hæmorrhage from the bowels followed by signs of intestinal obstruction might, in some cases, lead one to suspect an infarction if there was some possible cause for embolism or thrombosis present. It will have been noted that there was no blood passed in this case of mine.

Little need be said with reference to treatment. Any case presenting such symptoms as these would be looked upon by most medical men as one urgently requiring operative interference, and it would then depend on the extent of bowel implicated whether resection could be carried out or not. An example of successful resection for this condition is recorded in the *Annals of Surgery* for 1895.

The following discussion took place on Mr. Lentaigne and Mr. T. E. Gordon's papers:—

Mr. Wheeler agreed with Mr. Lentaigne in advocating a fistula before performing the operation for cancer of the rectum or excision of the bowel for malignant disease. Such a proceeding allowed a patient already run down in health to regain strength before excision of the bowel. He thought it a happy thing that bobbins would probably be required no longer since the discovery of Maunsell's method. He had, unfortunately, lost two cases by Murphy's button, to which he thought the result was due. The best result of excision of the large intestine he had ever seen was obtained by the late Dr. Kidd, and he, having excised the bowel for about six inches, sutured the bowel over a scoop cut out of a piece of carrot.

Dr. Harrison Scott said he had reduced an acute strangulated hernia in the case to which Dr. Gordon referred. On hearing of the subsequent obstruction he suspected that there were some bands from the former condition, but none were afterwards found. He thought the infarct was due to tertiary syphilis. In 1891 he had operated on a lady with a small tumour in right iliac fossa. On performing a laparotomy a tumour of the cæcum was discovered. The cæcum, with a small piece of ileum, was removed, and the ileum sutured to ascending colon. The case went on well for eight days, but then became collapsed, with normal temperature and rapid pulse. No bobbin was used. Death occurred in an hour. *Post-mortem* showed that the suture had given way, and extravasation of intestinal contents into abdomen followed. He mentioned a second case, in which he found peritonitis about the cæcum, with a tumour of colon near splenic flexure. A perforation of the colon was found at the seat of stricture. He was not able to make an artificial anus about the cæcum, as it was bound down by adhesions, but performed a resection of the cancer. He had never found the results of a direct colotomy favourable. He had only performed three resections of the intestine, and had used direct suturing. He had an objection to the use of any bobbin. He found that with two continuous sutures—first, a perforating one, and then a peritoneal one—a good junction could be obtained, and there was less risk of subsequent trouble.

Mr. R. Glasgow Patteson congratulated Mr. Lentaigne on his cases, and agreed with him on the advisability of immediate

suturing. He had no doubt that the misfortunes in Dr. Gordon's case were due to the bobbin. Deaths with Murphy's button, or other form of button, were recorded as due to secondary shock, but in these cases no *post-mortems* had been made, and, therefore, secondary shock was a condition with which he was not familiar. Such deaths he thought were due to septic peritonitis. He considered artificial means utterly unsurgical, and were simply devices to save the operator from his want of surgical technique.

Mr. Henry Gray Croly mentioned a case on which he operated for a tumour in region of cæcum. On cutting down a sarcomatous tumour was found. The tumour was adherent on every side, and could not have been removed by an incision on the opposite side. On exploration it burst, and proved to be the cæcum, with the intestine, but there had been no previous symptom of obstruction. The tumour was excised, and ileum brought to colon directly. Death occurred in three days. *Post-mortem* showed a leakage above the suture, where there was a perforated space. With reference to Mr. Scott's remarks, he did not think that he (Mr. Croly) had ever seen any bands which would set up symptoms of strangulated hernia a second time. He had had eighteen successful consecutive cases of colotomy, and had never regretted doing the operation. Colotomy relieved in a most remarkable way a man with cancer of rectum by staying the progress of the disease, and taking the fæces through a different channel. By keeping the patient alive for a year or so, it was all that surgery could do. He never understood what secondary shock was.

Mr. Lentaigne, in reply, said he agreed with Mr. Gordon as to the probable cause of the slough in his case. He did not employ Murphy's buttons, and considered their use likely to lead to ignorance of proper technique. He thought a surgeon should depend on his suturing and not on any mechanical treatment. Unless a man could suture securely he should not operate. Mr. Croly had misunderstood him in inferring that his incision for cancer should be on the opposite side of abdomen. His incision for the fistula should be on opposite side of abdomen, so that the fistula could act efficiently at a safe distance from the incision for radical cure, which should be made later on directly over the cancer. With regard to Mr. Croly's remarks on the duration of life after operation for cancer, his (Mr. Lentaigne's) second case was still living and perfectly well—that was for a period of two years after the operation.

Mr. T. E. Gordon, replying, said that although he used the Ball's bobbin, yet he wished it to be understood he did not use his means of suturing. He thought it unsatisfactory to make such a wholesale attack upon bobbins and other mechanisms, as some of the speakers had done. All operations with bobbins were by no means on the same lines. He thought, however, that Murphy's button was open to all objections brought forward. In some cases the button was used to hasten the operation, where purse-string sutures were used for the first row, and over that a second row of subserous sutures, very carefully applied. He did not consider that the best means, and would not use it again. Again, the bobbin was sometimes used merely as a means of support to the line of suturing and to facilitate the operation. In this case the first and second rows of sutures were applied with the same care. This was Mr. Robson's method.

PERFORATING GASTRIC ULCER SUCCESSFULLY TREATED BY OPERATION.

By JOHN CAMPBELL, M.A., M.D., F.R.C.S.Eng.;

Surgeon to the Samaritan Hospital for Women, Belfast;
Assistant Surgeon to the Belfast Maternity Hospital.

[Read in the Section of Surgery, May 13, 1898.]

Case.—The patient was a widow, aged thirty-five. Twenty years ago she had suffered for two years from persistent pain in the gastric region, which was aggravated by taking food. This disappeared, but for eighteen years she had been subject to attacks of pain of a neuralgic character, which occupied various situations—head, face, side, &c.—came on at regular intervals, and were relieved by quinine. About the beginning of July, 1897, an attack of apparently the usual character came on. It was, however, noticed by Dr. O'Hara that the paroxysms had a distinct relation to the times of taking food, occurring about three hours after meals. Vomiting after food took place twice. Under dietetic treatment the symptoms were becoming less acute. when, on July 20th, 1897, she took a small quantity of porridge and milk for supper at 9 p.m., and at about 10 30 retired to bed, and fell asleep. Before 11 she was awakened by a sharp pain in the abdomen, which she recognised as more severe than any she had previously felt. It increased in intensity when she got out of bed. Dr. O'Hara saw her at 1 30 a.m. She had then great pain in the left of the epigastric region, and had vomited twice since the seizure. There was some rigidity of the abdominal muscles, and no alteration in normal liver dulness. The pulse was 80, and the temperature normal. She got one-sixth of a grain of morphia hypodermically, and ʒ iv. of brandy by the rectum. At 1 30 p.m. on July 21st she was complaining of some pain in the epigastric region, and of inability to lie down, preferring a half-sitting posture in bed. Her pulse was 104, her temperature 101, and her abdomen was considerably distended and tympanitic. As the pulse and temperature had been getting worse hour by hour, it was decided to operate at once.

Chloroform was given by Dr. Mullan, and I proceeded to open

the abdomen, Drs. O'Hara and Currie assisting. A median incision in the epigastrium allowed some gas to escape, and showed the front of the stomach to be covered with a milky fluid, which welled out of the wound, and was sponged away to the amount of two ounces. Many patches of lymph were seen towards the upper border of the stomach and across the front of it towards the left. The thickness of the abdominal walls rendered a longer incision necessary, and it was accordingly extended from one and a half inches below the ensiform process to an inch below the navel. Careful inspection then detected greenish fluid welling out of the stomach near the lesser curvature and about an inch from the pylorus, the perforation being as large as a three-penny piece. Below and on the left the aperature was bounded by apparently normal stomach wall, and above and on the right by a mass of cicatricial tissue as thick as the forefinger. The opening was plugged with gauze, and the stomach area was packed round with towels which had been recently boiled. The edges of the opening were trimmed with scissors, the cicatricial tissue being freely removed, except above, where cutting it away caused free bleeding. The raw edges were brought together by a continuous suture of fine silk, including the whole thickness of the stomach wall. Over this about a dozen interrupted Lembert sutures were placed, and over all a piece of small omentum was tacked down by a continuous suture. The abdomen was cleaned by gauze sponges. A gauze drain was inserted in the upper angle of the wound, reaching well over towards the spleen, where the gastric contents had spread most freely. The lower three-fourths of the wound was closed by interrupted silkworm-gut sutures. Owing to the distension great difficulty was experienced in getting the abdominal walls to meet over the bowels. Iodoform dressings were applied.

After Treatment.—A copious enema given after operation proved very effective in relieving thirst. Nutrition was kept up for five days by enemata. Then feeding by mouth was cautiously commenced, water being given first, then animal extracts, and then milk. The gauze drain was removed on the fifth day, and the stitches on the fourteenth day. The track in which the gauze drain lay healed by granulation, the rest of the wound by immediate union. On the third day the pulse slowed down remarkably, and remained for twelve hours under sixty in the minute.

Remarks.—The abdomen was not flushed out because we thought the stomach contents had not spread far beyond the gastric region, and we feared that flushing might only disseminate them still further. Therefore sponging and drainage were relied on. Previous to closing the abdomen the cavity of the small sac was inspected through an opening torn in the omentum near the lower border of the stomach. It was found to be uncontaminated, showing that the posterior wall of the stomach was intact. The progress after operation was in every way excellent. Both pulse and temperature at once fell, and remained down throughout the period of convalescence. The patient is now well, and has been free from pain since the operation. Much credit is due to Dr. O'Hara for his promptness in recognising the nature of the illness and in at once advising operation.

Dr. Craig thought Dr. Campbell very fortunate in having secured such a case, as all cases were not suitable for operation. He thought the operation could be undertaken only when the ulcer was still acute, was situated on the anterior wall of stomach, and where firm adhesions had not already formed. When on the posterior wall adhesions would probably have formed, and the patient die from hæmorrhage, localised abscess, or other causes; also, an ulcer on the anterior wall was easily reached. The result in this case had removed from his mind the great gravity of recommending laparotomy in cases of perforating gastric ulcer. In this case the position of the ulcer exactly coincided with where an ulcer most amenable to treatment should be. It was evidently a recent or acute ulcer, and the existing cicatricial tissue evidently the result of the old ulceration which had existed twenty years before, or at later periods.

Mr. Myles related the case of a servant maid suddenly taken ill. Perforation was easily diagnosed, and patient was exceedingly collapsed. Consent to be operated on was not obtained till the fourth day, when an immense collection of pus was distinguished on opening abdomen; the surface of stomach was covered with lymph, and adhesions had formed everywhere. It was impossible

to determine the actual point of puncture. The abscess cavity was drained. Death followed. In a second case, on which he operated six hours after perforation, the abdomen was found full of blood. Patient had had symptoms of collapse, constant pain, and vomiting blood. The perforation was easily found and sutured, but, unfortunately, the girl died after leaving theatre. In a third case perforation was found on posterior wall. It was impossible to drain the cavity owing to the situation. Death followed some weeks after operation. The operation of suturing a perforating ulcer on anterior wall of stomach was not, in his opinion, very difficult, provided proper access to stomach could be obtained. He thought that in future he would enlarge the ordinary vertical incision by an oblique incision, as the increased facility of operation would more than counterbalance the disadvantages of liability to ventral hernia and greater shock. He saw the case of a child where perforating gastric ulcer was diagnosed. Operation was not allowed, and the boy was perfectly well in two days. The diagnosis was, therefore, not so easy.

Mr. Frazer gave a case where perforation occurred at back of upper curvature. Death in ten days. Position of ulcer found at *post-mortem*. He did not see how it could have been easily reached by operation. He gave two other cases which recovered under medical treatment, but death took place at distant intervals by both ulcerations giving way. In one of these cases the patient, a woman, ate a hearty meal, including peas. Symptoms of perforation were present, and after death some peas were found in her pelvis. He had seen a case of typhoid fever where perforation undoubtedly occurred, but recovery took place.

Mr. R. G. Patteson said that in the majority of these cases the patient was not seen in the acute stage, or when perforation was recent. The patients were generally seen when several attacks of inflammation had caused adhesions, abscesses had formed outside the stomach, and a fatal result was brought about by perforation of the sac of the secondary abscess cavity. He gave a case where such had occurred. Whether the ulcer was acute or chronic was important. In cases which he had examined *post mortem* he found that in the area surrounding the ulcer there was a considerable amount of induration, where the gastric wall was enormously thickened, where any attempt at inversion of the wall to close the ulcer, or suture of any kind, would be difficult without invaginating a considerable area of stomach wall. If one had to excise a

large indurated area probably cicatricial tissue would not unite in the same way as healthy mucous membrane. Every moment of delay added to the gravity of the operation. Perforations due to perforative peritonitis in typhoid fever could not be classed with such cases, as the ulceration is generally multiple, and although one perforation might be closed by operation, there was no guarantee that there were not other points about to rupture. It was much more difficult to close the stomach wall in a state of induration due to chronic inflammation than to close the intestinal wall.

Mr. Henry Gray Croly said that such a case as Mr. Campbell's some years ago would have been placed under the physician and treated expectantly. The case showed that the sooner laparotomy is done the better.

Dr. A. J. Smith had seen two cases of perforating gastric ulcer. The first case, that of a young girl, had been on dietetic treatment in a hospital. One day she was seized with a sudden pain in abdomen while in a tram, and was brought to St. Vincent's Hospital, and placed under care of Mr. Tobin. When admitted she was partly collapsed, and had a peculiar cyanosed condition of face, collapsed pulse, and slow respiration. On palpation a dull area over anterior surface of stomach was found. The abdomen was opened the following morning, and milk and bread came from it. Adhesions were present. Plugged with iodoform gauze, and patient recovered. The second case was that of a woman brought to hospital with sudden pain in abdomen and collapse. Cyanosis present, but no dull area detected in epigastrium. There was absence of liver dulness. Death ensued. *Post-mortem* showed abdominal cavity full of a hearty meal. He could hardly conceive how one could treat a case when the stomach was full and the contents spill over the abdominal cavity. He believed that when rupture occurred on anterior wall, and when stomach was empty, surgical treatment was of avail, but not otherwise.

Mr. Lentaigne asked if there was any modification of liver dulness in Mr. Campbell's case? He had two cases recently under his care, in both of which there was absence of liver dulness. In the first case operation was not allowed, and patient died in two or three days. *Post-mortem* showed a gastric ulcer on anterior wall of stomach. The symptoms of the second case were similar, and at request of patient, though against wishes of parents, the abdomen was opened. However, the perforation could not be

found, and was not certainly on anterior wall. He introduced a gauze drain, and endeavoured to give relief. Patient died in a week. *Post-mortem* showed a perforation on posterior wall, and quite inaccessible.

Mr. John Campbell, in reply, said that although the anterior wall is by far the most favourable situation, still it was possible to deal successfully with a rupture on posterior wall at times, as is proved by a late successful case under Dr. Walton Brown, of Belfast. Regarding likelihood of success, his own case was fortunate in respect to the amount of extravasation, which, he thought, had more to do with success than anything else. The more extravasation, the less chance of success. Probably it was not worth while to operate later than twenty-four hours after perforation. With reference to flushing *versus* sponging the abdominal cavity, he was in favour of the latter, as it was easier for the patient, and flushing often diluted and disseminated the material through the cavity. He was against operating in perforation from typhoid ulcers, as the patient was not able to bear a laparotomy. In answer to Dr. Lentaigne, he said that liver dulness was present three hours after perforation, but had disappeared fourteen hours after.

SECTION OF OBSTETRICS.

A CASE OF RUPTURED TUBAL PREGNANCY, WITH INTRA-PERITONEAL HÆMORRHAGE; OPERATION; RECOVERY.

By ALFRED J. SMITH, M.B.;
Gynæcologist to St. Vincent's Hospital;
Examiner in Midwifery, Royal University of Ireland.

[Read in the Section of Obstetrics, November 26, 1897.]

I VENTURE to bring before this the Obstetrical Section of the Royal Academy of Medicine notes on a case of ruptured tubal pregnancy. I am indebted to Dr. O'Donnell, Pembroke-road, for the exhaustive notes he has given me of the previous history. It is as follows:—

"B. S., twenty-nine and a half years, married five years, always healthy, had three children. She was unwell only three times since marriage, and all confinements favourable. Her last child was born in the middle of March, 1896, and she nursed it for twelve months—till March the 22nd, 1897. She was not unwell since her last confinement, but thought she was pregnant since the middle of last January. She imagined she went on in the usual way, and by the middle of May she was so large that 'everything' was noticeable with her clothes on. About the 17th of May she suddenly got very severe pains in her abdomen, with vomiting. The pains were like her ordinary confinement pains; they lasted an hour, and, with a movement of her bowels, disappeared. She was all right for the next four or five days, until Friday, the 21st. About 7 o'clock in the evening the same kind of pains returned, with the vomiting; her bowels also moved very freely, and she got so weak that she had to be helped to bed. Her husband gave her some brandy, and she fell asleep until 3 o'clock a.m. on Saturday morning. She felt then much worse, with the pains shooting through her breasts and out through her shoulders. She remained in this condition until I saw her at 10 a.m. on the same day. I found her very bloodless, with small pulse, and perfectly prostrate.

There was no external hæmorrhage, nor was there any swelling in the abdomen that could be determined by a very limited examination by palpation. Per vaginam there was nothing to be felt in the uterus. I considered that it was a case of ruptured tubal pregnancy, and called in Dr. Rowntree both for his advice and to take charge of the patient while I could procure the services of Dr. Alfred Smith, with a view to operation in case he considered it favourably."

I saw the case in consultation with Dr. O'Donnell on the night of May 22nd, 1897, and found the patient very collapsed, anæmic, and much distressed from loss of blood. I quite agreed with the diagnosis of ruptured tubal pregnancy, and urged the advisableness of immediate operation. It was out of the question to undertake the operation at Kingstown. I telephoned to St. Vincent's Hospital to have everything ready for abdominal section. I administered to the patient morphia (¼ gr.) hypodermically, got her transferred (wrapt up in blankets) to a cab, and sent her on to the hospital. She arrived there very little the worse of her journey. She was placed on a Trendelenburg table, and, with the assistance of Mr. M'Ardle, Dr. O'Donnell being present, I opened the abdomen, turned out the large blood clots, ligatured and removed the ruptured tube. While removing the clots I secured a large tuft of chorionic villi and also a small fœtus enveloped in its amniotic sac.

I then poured into the peritoneal cavity some saline solution, and closed the abdomen, leaving a considerable quantity of fluid blood behind. The after-history of the case is uneventful. She rapidly regained strength, and left the hospital four weeks after the operation.

Her history after she left the hospital is very remarkable and worthy of notice. Dr. O'Donnell reports:—

"The patient's changes came on one week after operation. She was unwell regularly up to the 10th of August, and she is now pregnant for the past three months, feeling strong and as well as she 'used to.'"

The specimen [exhibited] was a Fallopian tube of the left side, showing a rent through its inferior border at the junction of the ampulla with the isthmus. There is also to be seen a large circular opening, sufficient to admit the tip of the index finger, in the posterior layer of the broad ligament, quite close to the rupture in the tube and leading to it.

The tuft of chorionic villi is characteristic, and presents no unusual features. The fœtus is enveloped in its amniotic sac; it is about half an inch long, and is approximately the growth of between eight and ten weeks' gestation.

The points of interest seem to me to be :—

(1.) The occurrence of a tubal pregnancy in a patient so prolific—she had three children in five years.

(2.) The history of a secondary rupture; pain occurred first on the 17th of May, which was followed by a period of quiescence, and a return of the pain on May 22nd is confirmed by the pathological specimen, which shows, I think, evidence of a primary rupture between the layers of the broad ligament and a secondary one into the peritoneal cavity.

(3.) The absence of any hæmorrhage per vaginam.

(4.) The fact that the patient is again pregnant so soon after such a serious operation.

I feel bound to state that I believe this patient owes her life to the early recognition of the ruptured tube, and I take this opportunity of congratulating Drs. O'Donnell and Rowntree on their brilliant diagnosis.

[Dr. Jellett also showed for Dr. Purefoy a specimen of ruptured tubal pregnancy.]

Dr. F. W. Kidd, in remarking on Dr. Purefoy's case, said that one point of interest was the occurrence of extra-uterine pregnancy, presumably within a very short time after the patient's previous pregnancy. Certainly it was his (Dr. Kidd's)

idea that a good many authorities had laid stress on the fact that there usually existed a long period of sterility before extra-uterine pregnancy occurred.

Mr. M'Ardle, in referring to the specimen exhibited by Dr. Jellett for Dr. Purefoy, asked why he had delayed in dealing with the abnormal condition of things. Was it anxiety to allow pregnancy to go on further in the uterus, or was it that the low vitality of the patient frightened him from performing the operation? He (Mr. M'Ardle) thought that in an operation that need not be long, laparotomy was not contra-indicated in the very lowest state of vitality so long as there was no sepsis present. He believed laparotomy to be one of the least harmful of operations when properly conducted, because he had seen patients recover after laparotomy who certainly would not have recovered after operations on the limbs. With regard to Dr. Smith's case, he (Mr. M'Ardle) had assisted him at the operation. What struck him about the operation for ruptured tubal pregnancy was that there was a great deal dependent upon the rapidity with which the broad ligament was secured, and a point of great surgical importance was the clamping of the broad ligament by the two hands until the blood-clot was removed. He was struck at the method by which Dr. Smith grasped the broad ligament along the pelvic walls until the abdominal cavity was thoroughly freed of blood-clot, and enabling him exactly to secure the point of rupture.

Dr. More Madden said that both Dr. O'Donnell and Dr. Smith deserved the greatest credit for the way in which they had conducted the case. As to the cause of the tubal pregnancy, that was an interesting question. Why should a woman who had been so prolific before have a tubal pregnancy instead of a uterine? Was it that the woman had been suffering from an attack of endometritis, and that the uterine end of the Fallopian tube had become blocked in some way by some inflammatory exudation?

Dr. E. Hastings Tweedy said that a new operation—colpotomy—for tubal pregnancy had recently been made popular. He had never seen colpotomy performed for this condition, and would like to know if Dr. Smith had ever performed it, and what he thought of the operation as compared with the abdominal method. In his opinion the abdominal method was accompanied with more shock. Mr. M'Ardle had remarked on the safety of abdominal section. This, of course, was quite right, but at the same time there is great shock when the abdomen is opened and the intestines handled, whereas there is little or no shock by the vaginal method. He thought

that Dr. Smith's case would have been a favourable one for anterior colpotomy. With regard to Dr. Jellett's case, Dr. Jellett had remarked that he tied the tube and ovary and cut it away, fearing that the tumour in the uterus might be a soft myoma. He (Dr. Tweedy) thought that Mr. Lawson Tait had pointed out that soft myomata are unfavourable for the operation of ovariotomy, and under those circumstances, if Dr. Jellett had been dealing with a soft myoma, it was probable that no good had been done by cutting away the tube, and if the uterus was pregnant, he thought it was doing harm to cut out the tube and ovary.

Dr. Smith, replying, said he had first to ask if Dr. Jellett had noticed any rhythmical contractions in the tumour or uterus during examination; this would assist in the diagnosis of pregnancy. In answer to Dr. More Madden, he (Dr. Smith) could not say if there had been any history of endometritis. With regard to Dr. Tweedy's question about colpotomy, he (Dr. Smith) had never performed the operation. He was sure it had all the advantages claimed for it by those who advocated it. He had never had any difficulty or bad result in treating cases by abdominal section. He had therefore no reason for changing a method which had done him such good services.

Dr. Jellett said, in answer to Mr. M'Ardle, that the patient was not operated upon immediately because the case was not diagnosed as a ruptured tubal pregnancy, and, as the operation proved, was not one such as Dr. Smith had described, but rather a hæmatoma of the broad ligament accompanied by a very small pelvic hæmatocele, the formation of which had been a more or less chronic and not an acute process. Again, when first seen, the patient was suffering, not from the effects of hæmorrhage, but from general malnutrition. In answer to Dr. Tweedy, he thought that castration often did not check hæmorrhage coming from a large soft myoma, but he did not know that if a small soft myomatous uterus had its appendages removed at an early date, there were any statistics to prove that it continued to increase in size.

THE VAGINAL PLUG IN ACCIDENTAL HÆMORRHAGE.

By E. HASTINGS TWEEDY, F.R.C.P.I.;
Gynæcologist to Dr. Steevens' Hospital;
Formerly Assistant-Master, Rotunda Hospital, &c.

[Read in the Section of Obstetrics, January 7, 1898.]

ACCIDENTAL hæmorrhage is one of the few complications in midwifery concerning which a marked disagreement as regards treatment exists. The term itself is now used in a very definite sense, and signifies an *ante-partum* bleeding occurring after the seventh month of gestation, from beneath the normally-implanted placenta. Before discussing this question, however, it is well to draw a distinction between those hæmorrhages associated with an atonic uterus and those not so associated.

In the absence of labour the diagnosis between these conditions may present some difficulty, but should labour be in progress the presence or absence of a contracting uterus will at once decide the point. If labour pains are strong and the os dilated the prognosis is decidedly good, and to rupture the membranes, or turn and bring down a foot, will, as a rule, suffice. Forceps may at times be indicated, and even accouchement force can, under the circumstances, be as a rule successfully accomplished. But in the presence of an atonic or inert uterus, with a long unretracted cervix and a partially opened os, how can we hope to improve matters by any of the above proceedings?

Rupture of the membranes, with or without podalic version, does not excite the uterus to contract for many hours. The hæmorrhage, therefore, is most likely to continue, and the operator, in spite of his better judgment, is

not infrequently compelled to employ forcible dilatation of the cervix and rapid delivery.

In doing this the cervix is liable to be torn, and large branches of the uterine artery to be laid open; but even should the latter accident be avoided, the performance of this forced delivery produces a condition of shock which proves but too frequently greater than the patient can bear. It is no exaggeration to say that the performance of Porro's operation even would, under the circumstances, be a less hazardous proceeding. In the vaginal plug, however, we have an alternative to the above line of treatment, capable, I believe, of obviating the worst dangers arising from accidental hæmorrhage.

It is curious to note that on few devices has greater obloquy been heaped than on this, and yet it seemed to Dr. Smyly, during the latter years of his Mastership in the Rotunda Hospital, to present fewer disadvantages than any other proceeding, and accordingly it became the "routine" treatment in that Institution. Dr. Smyly dealt with this subject in a paper read before the Obstetrical Section of the British Medical Association, at their annual meeting held in Bristol, and in it maintained that a properly applied tampon prevented external bleeding, excited labour pains, and induced rapid dilatation of the os—this latter taking place without any fear of laceration, or loss of its single layer of epithelium so necessary to it as a barrier against germ invasion. He also stated that in the event of concealed hæmorrhage still flowing, the intra-uterine tension would thereby be increased, and a greater and greater difficulty would thus arise against a systemic leak, and that this would be more readily brought about were a tight abdominal binder also applied. He did not advocate the plug save when the membranes were intact—a condition of course found in the majority of cases.

Few, I think, will be found to deny any of the claims so far made in favour of the vaginal plug, but its action is more far-reaching, I believe, than Dr. Smyly has contended, for it acts not alone in the manner he states, but also and above all as a tourniquet to the uterine arteries.

If the cervix is fixed, and at the same time forcible pressure exerted on the vault of the vagina in the region of the lateral fornices, the uterine arteries become acutely bent and their blood-flow impeded. This is probably brought about by the drag exerted on them through their cervical branches. On the pregnant cadaver I have had but one opportunity of verifying this statement, and here shortly after death I easily induced this bending by exerting firm pressure in the lateral fornices. Other proofs, however, are forthcoming in support of my contention. Hysterectomy by Doyen's method furnishes us with an example of the complete manner in which the uterine circulation can be controlled by a down drag exerted on the cervix; and finally, there is abundant clinical evidence to show that blood to any serious extent does not form above a properly-fitted tampon.

I am aware that this statement will not meet with universal assent, for as a matter of fact many cases of death have been recorded where this treatment was employed. But was the tampon properly applied in these cases? I think not.

In the discussion which followed the reading of Dr. Symly's paper, one gentleman of great eminence stated that he carried a boiled sponge in his bag for the purpose of plugging the vagina; another stated he preferred his silk pocket handkerchief. In other cases I have seen tenax, dry cotton wool, iodoform gauze, and a torn shirt used for the purposes of a tampon. With examples such as these before me I trust I shall not be considered pre-

sumptuous in assuming that the proper material to use, or the proper mode of its application, is not universally known.

To accomplish this little operation in a satisfactory manner many pieces of sterilised cotton wool are required, each the size of a small closed fist, and should be placed in a weak antiseptic solution. The patient is then brought out to the edge of the bed, put lying on her left side, and when the vulva and vagina have been asepticised and the bladder emptied, the pieces of cotton wool are taken one by one, squeezed of their superfluous fluid, compressed into a comparatively small compass, and inserted without the aid of a speculum in such a manner that the entire cervix is surrounded by pledgets before the os is covered. Each piece is packed as tightly as possible, and then the vagina is filled to its utmost capacity down to the urethra; a diaper placed between the thighs, and a tight abdominal binder complete the operation.

It is simply astonishing the amount of cotton wool that can be introduced in this manner, and how hard and incompressible such a plug becomes, and it is in favour of such a tampon only that I contend. Hæmorrhage ceases when it is thus inserted. The cervix safely and rapidly dilates, in a manner much to be preferred to that accomplished by hydrostatic bags. Labour pains, moreover, are induced quickly. This latter effect is probably in great part to be accounted for by the inevitable accumulation of carbonic dioxide gas, which must form in the uterine muscle in consequence of the obstruction to its vessels caused by the tampon

The cervix, though becoming dilatable, does not always dilate, nor is it drawn up until the plugs have been removed, and so markedly was this a fact in one of my cases that, though the os when first felt while removing

the pledgets did not appear to have a greater diameter than a two shilling piece, it had nevertheless fully dilated before the end of the operation, a period of not more than two minutes having elapsed between the two observations. In fact it seemed to spring open when once the restraining pledgets were taken away. Nor is the tampon applicable to those cases alone in which the membranes are intact, for the circulation in the uterine vessels is still controlled even after their rupture.

I have not seen any cases in which hæmorrhage continued in spite of this treatment, though one woman unfortunately died shortly after I had inserted the plugs. Her history is briefly this:—The case occurring in the Outpatient Maternity Department of the Rotunda Hospital, she was at first attended by the night students on duty, who promptly summoned the Clinical Clerk, and when eventually I saw her she was in a condition of extreme collapse, with blood still freely flowing through an inefficient tampon. This was immediately removed, and a new one placed in position, then an intravenous injection of several pints of saline solution was administered. She died suddenly two hours later from shock, no hæmorrhage having either passed through or been extravasated above the tampon, and this in spite of the large quantity of saline solution injected. How could the hæmorrhage have ceased in this case were the circulation in the uterine vessels not directly interfered with?

The conclusions arrived at here are as follows:—

1. The vaginal tampon when properly applied is the most suitable treatment we possess for the worst forms of accidental hæmorrhage.

2. It may be relied on as sufficient in the majority of cases not amenable to other treatment.

3. It controls the circulation in the uterine arteries, acting in much the same manner as does a tourniquet.

4. It dilates the cervix partly by exercising a peripheral force on that structure, and in part by exciting uterine contractions.

5. These latter are induced not alone as a consequence of cervical dilatation, but are chiefly attributable to the power the tampon possesses of bringing about an accumulation of carbonic acid gas in the uterus.

Dr. Winifred Dickson said that accidental hæmorrhage had always seemed to her to be the very worst complication in midwifery. Why did he (Dr. Tweedy) think it better not to use the speculum? She thought that the plug ought to be sterilised. Did he plug with balls of cotton wool, and did he attach strings to them in order to facilitate their removal?

Dr. Macan thought that accidental hæmorrhage was amongst the most difficult of the accidents of parturition to treat. He could recall several cases where Dr. Tweedy's treatment might have been of service, if it was as serviceable as he (Dr. Tweedy) hoped it to be, but he (Dr. Macan) wanted proof of the statement that the uterine arteries are stopped by the process of plugging. As far as internal accidental hæmorrhage goes, before total detachment of the placenta, his method stopped the uterine arteries, and his treatment in these cases was most favourable. Plugging might be carried out as long as the membranes were perfect, but, after their rupture, there was no means of increasing the intra-uterine tension. So far, he (Dr. Macan) preferred to introduce a Barnes's bag in preference to plugging the vagina; also, in placenta prævia, where the bleeding surfaces were quite close, he preferred to use a Barnes's bag. He did not understand how Dr. Tweedy's method could twist the arteries very much, nor how the accumulation of carbonic dioxide could take place.

Dr. Alfred J. Smith said that he did not understand how a vaginal plug would so act as to compress the uterine arteries. Dr. Tweedy wanted them, he thought, to believe that his method was different from the method adopted in hospitals. To his mind the great difficulty in dealing with such cases was not in cases where

labour had started at all, but in cases of concealed hæmorrhage, where the patient was collapsed and almost pulseless, with no labour pains, cervix quite hard, and where there was a pathological condition of the uterine muscular fibres. He thought that the best treatment in grave cases would be to ligature the uterine arteries direct, and the uterus could be then removed. Death from accidental hæmorrhage generally occurred after delivery, up to two hours after parturition.

Dr. Doyle considered that unless an artery was atheromatous very little pressure would stop it.

Dr. R. D. Purefoy said that the practice in the Rotunda Hospital in such cases was to plug, and that accumulating evidence was distinctly in favour of continuing the practice. He thought that such subsidiary means as the use of a firm binder should not be forgotten, and also the stimulation of the uterine contractions by the careful manipulations of both hands.

Dr. Knott also spoke.

Dr. Tweedy, replying, said in answer to Dr. Dickson that he always used sterilised cotton wool. A much greater quantity of wool could be pressed into the vagina without a speculum. He did not employ strings, as by so doing he did not see how so tight a plug could be made with strings as without, and there was no difficulty in removing the pieces of cotton wool. Dr. Macan had said that he (Dr. Tweedy) had not adduced any evidence to show that the circulation was impeded. He (Dr. Tweedy) said that in one of the cases which he had been able to study he was easily able to bend the whole broad ligament by pressing in the lateral fornices and pulling down the cervix, and was able to tighten the lower portion of the broad ligament against the upper portion. A branch of the uterine artery ran to the cervix before the uterine artery entered the uterus, and if the cervix were pulled upon, and a plug placed outside the branch, the uterine artery must receive a sharp bend at the plug.

VAGINAL CŒLIOTOMY.

By T. HENRY WILSON, F.R.C.P.;
Late Assistant Master, Rotunda Lying-in Hospital.

[Read in the Section of Obstetrics, February 11, 1898.]

I DO not intend to enter upon the controversy as to whom the credit of introducing this operation is due, but rather to consider vaginal cœliotomy as a recognised operation, and to confine my remarks more especially to this method of dealing with pelvic tumours and adhesions.

First of all, as to whether it is better to open the peritoneum between the uterus and the bladder or in Douglas's pouch.

There are many who consider that, under all circumstances, the anterior route is the better. This I believe to be an error; for, though the anterior incision has many advantages over the posterior, I think that here, at any rate, every case should be judged on its merits.

The method of reaching the peritoneal sac by the anterior route consists of drawing down the cervix as far as possible with a bullet forceps, dividing the mucous membrane of the vaginal wall from about two cm. below the urethral orifice, or slightly further, to the anterior vaginal fornix. This may be modified by making a transverse incision at the lower end of the vertical one, or, if it is thought necessary to narrow the lumen of the vagina, the incisions usual for anterior colporrhaphy may be made, and the flaps of mucous membrane removed. Unless the latter procedure is followed it will now be necessary to reflect the vaginal mucous membrane from the bladder and lower part of the cervix. This can almost invariably be done with the thumbs alone; but, in

some instances, it may be necessary to assist with a scalpel or scissors.

The next step consists in defining the lower limit of the bladder, which may be ascertained by means of a sound introduced through the urethra. The bladder is now to be separated from the cervix and body of the uterus by pushing it up towards the fundus as far as, or slightly further than, the os internum. This again should be done with the thumbs, but in some cases the connection is very firm, and, if it is necessary to use the scissors or scalpel, more particularly before any separation of the bladder has been effected, particular care must be taken to cut into neither the bladder nor yet the cervical tissue, as the difficulty thereby is only increased. Only the thumbs should be used to separate the bladder laterally, if this is thought necessary, as the ureters are in close proximity, and the danger of wounding them must be remembered.

When the bladder has been pushed up, should the peritoneum not have appeared, it will be necessary to pull the fundus of the uterus still further down. This is best done by using a couple of small-sized tenacula in a hand-over-hand fashion, or by passing a stout silk ligature through the anterior wall of the uterus and pulling on it. The practice of using a bullet forceps for this purpose is not to be recommended, as very often they tear out, especially if the uterus is at all friable, and hæmorrhage extremely difficult to stop may be the result. The reflexion of the peritoneum then appears, or may be felt by the finger; it is incised, and the fundus of the uterus brought through the opening. This procedure may be assisted by pushing the cervix backwards and upwards by means of the bullet forceps, which is still attached to the anterior lip. The blade of a retractor is now introduced and pulled upwards to keep the bladder out of the wound, and the finger passed in through the opening.

In a large majority of cases adhesions of the ovaries, tubes, and uterus can be separated, and the adnexa drawn down into the vagina and examined; if healthy, they are returned to the abdomen, and if diseased it may be possible to excise the affected portion, or it may be necessary to remove the entire tube and ovary.

There is no difficulty in removing small subperitoneal or pedunculated myomata. In the case of the former occurring on the posterior surface or on the fundus, the edges of the peritoneum should be brought together, and deep sutures, including the whole base of the wound, used if there is any hæmorrhage.

Small ovarian or parovarian cysts are easily brought through, or, if only slightly too large for this, they may be punctured before removal, and their size thus diminished.

All bleeding having been controlled the fundus is now to be replaced. If the uterus was originally in a normal position the opening in the peritoneum should be closed, and the bladder stitched back on to the body and cervix by a continuous very fine silk or catgut suture, merely including enough tissue to keep the parts in apposition, and care being taken not to puncture the bladder with the needle. The vagina wound is now closed and a tampon of gauze placed in the vagina.

The urine should be drawn off with a catheter every six hours for the first two days in order to prevent overfilling of the bladder and disturbance of the parts. I cannot say I approve of vaginal fixation of the uterus as a part of this operation, even in cases where it was previously retroverted, except under two conditions—firstly, in women past the childbearing period; and secondly, where the anterior wall of the uterus has been lacerated by bullet forceps or otherwise, and where it is impossible to control the hæmorrhage by other means. If retroversion was present a suitable pessary should be used instead of the vaginal plug.

Vaginal cœliotomy by the posterior route is undoubtedly limited in its application to pelvic surgery. The reason of this is, that in order to open the peritoneum it is necessary to retrovert the uterus, and the fundus thus lying in the hollow of the sacrum effectually prevents any manipulation above or in front of it.

The procedure is as follows:—The posterior lip of the cervix is caught by a pair of bullet forceps, the uterus drawn down, and the cervix held forwards towards the symphysis. The posterior vault of the vagina is steadied by a pair of mouse-toothed forceps, and divided in front of this—that is, just at the reflexion of the posterior vaginal wall on to the cervix by a transverse incision about 2 cm. long. The peritoneum may now be felt between the point of the finger and the uterus, or a little dissection may be required, but care must be taken not to open into the rectum. The peritoneum having been divided, the opening may be enlarged by extending the incision on either side.

With regard to *pelvic hæmatocele*, where the bleeding has only just stopped when the patient is first seen, I am not going into the question as to whether these cases should or should not be operated upon, but I think that if sufficient time has elapsed for adhesions to have formed above the extravasation, vaginal cœliotomy by the posterior incision is the proper treatment, as the adhesions will be slighter and the dislocation of the uterus less than if the larger blood-clot be left to organise, even though some of it may be absorbed.

There is no breaking down of the provisional barrier formed between the general cavity and the extravasated blood. Should fresh hæmorrhage occur the cavity may be tamponed easily, and if by chance any blood-clot remaining behind should become infected there is a ready exit for the discharge.

The same arguments hold good with cases of pelvic abscess,

modifying the position of the incision to suit the case, and I believe the same procedure should be followed.

Again, in case of adherent ovary causing uncontrollable pain, and where it is intended to remove it, I think in some cases it would be far easier to do this by the posterior than by the anterior route, as often the ovary is densely adherent to the rectum deep down in Douglas's pouch.

Tubal pregnancy before rupture has occurred is, I believe, suitable for this method of treatment, but if called on to operate immediately after rupture of the tube, where possibly every minute is of importance, there can be no question that the vaginal method is contra-indicated.

So far I have not referred to the question of operating by this method on cases of pyosalpinx, as I consider it of sufficient importance to be dealt with separately.

Without going into the pathology further than saying that it is usually of gonorrhœal, tubercular or puerperal origin, and that it is usually bi-lateral, I think these two facts should influence the method of operation considerably.

The ease with which a pus tube can be ruptured is only to be appreciated by those who have had the misfortune to meet this complication while separating the adhesions which are almost always present when the sac attains to any size. The point of rupture is nearly always on the posterior surface—that is to say, the most unfavourable position when operating from below. Should this occur, one would have to trust to drainage, but with the uncomfortable feeling that the whole field of operation is probably infected, and that had simple drainage been decided on originally a probably much more favourable site for the incision could have been chosen, where the cavity could have been douched and tamponed as often as necessary.

When the tube is small and the adhesions slight there should be little difficulty in the removal. But in the greater

number of cases—seen, at any rate, in hospital practice—the disease is of long standing, with greatly enlarged tubes, which are universally adherent.

It is intended to remove these, and I ask of what use is the uterus, which is very probably itself diseased, to a woman without either ovaries or tubes? I am aware that there is a very reasonable objection to removing more than is necessary, but to take away both tubes and ovaries, and then to congratulate oneself on having spared the uterus, is to sacrifice the safety of a patient to mere sentiment. On the answer to this question depends, I believe, whether the vaginal route is suitable for the cases I specify.

If it is decided to leave the uterus I consider abdominal section to be indicated, and I need not go into the technique. But if the uterus is to be removed, then undoubtedly I think that the vaginal method is the proper course to pursue.

After the removal of the uterus the adhesions of the tubes can be dealt with much more easily, and once these are separated there is not the same danger of rupturing the sac by trying to get it through a small opening. Even if it does burst, the pus flows directly down into the vagina, and you have no infected uterus to return to the abdomen. If everything has gone well the vaginal vault is either closed altogether or a tampon of gauze inserted. If the pus has escaped, drainage of course will be necessary.

The treatment of large myomata of the uterus is outside the limit I have laid down for myself.

The difficulties and dangers of this method depend, as in abdominal section, almost entirely upon the state of affairs within the pelvis, but they may arise sooner.

The first difficulty is that of making the vagina practically aseptic, and the second, with which I have already dealt sufficiently, is in reaching the peritoneum when opening in front of the uterus.

The practice of douching and packing the vagina with gauze for two or three days previous to operation I consider to be bad. To be of even theoretical use the vagina must be completely distended, and owing to the pain this causes I have never yet met a patient who could stand this being properly done a third time. Even if it is done, most of the superficial epithelium is removed, and the vagina, though perhaps aseptic, is in the best possible condition for the absorption of septic material.

The preliminary preparation should consist of that usually carried out in abdominal surgery—viz., purgative, suitable diet, and the preparation of the abdomen. The pubis should also be shaved, vagina douched with weak creolin lotion, and thoroughly washed with soap.

On the morning of the operation, the patient having been anæsthetised, an assistant should thoroughly wash the vulva and vagina, introducing a piece of soap in order to stretch the vaginal walls. The uterus should then be curetted and packed with gauze (which must be removed at the end of the operation). In order to remove any greasy material the parts should be thoroughly washed with ether applied on small pieces of absorbent wool, special attention being given to the vulva and vagina. As long as the wool becomes discoloured the washing should be continued. The external parts may now be washed with corr. subl. 1–500, and the vagina douched with plain warm water or creolin lotion.

The danger of wounding the ureters in vaginal work is also one that is generally recognised. I only remember having once seen this unfortunate accident happen, in which case both ureters were tied, but the operation was one of abdominal hysterectomy for carcinoma. The danger of hæmorrhage—impossible to control from below or going on unnoticed until symptoms set in—is certainly possible, the latter especially after breaking down adhesions in cases of retroversion or

flexion. I should say, however, that the chances were certainly less than in separating them by the Schultze method. The treatment in all cases would have to be the same—viz., immediate abdominal section.

Then, again, it may be found impossible, even after a certain amount of separation has been effected, to finish the operation from below, and in these cases, unless the general condition of the patient is such that prolonged operation is increasing her risk, I hold that the abdomen should be opened and an examination of the state of affairs made. The advantage of this course is obvious; any separation that has been made below is still fresh and may be of assistance, while if only an exploratory incision is made the extra risk should be almost *nil*. If it is considered possible to complete the operation it should be done at once, but if inoperable the case must be left. And here I should say that owing to this possibility, and to the possibility of hæmorrhage before referred to, I am strongly of opinion that no man is justified in undertaking this operation who is not ready to open the abdomen if necessary. I have seen at least one case where the patient's life was undoubtedly saved by the promptness of this proceeding. The case was one of hysterectomy by the combined method. The clamp securing the uterine artery was taken off by accident at the end of the operation, which was otherwise without difficulty, and it was impossible to seize the artery from the vagina. I mention this case to show in what a very simple manner such a complication might arise.

There are many conditions where this method of dealing with intra-pelvic disease is inferior to abdominal section—for instance, in cases where the pelvis is deformed or is deep and narrow, in cases of dermoid tumours unless they are small enough to remove without tapping, in cases of large ovarian cystomata or advanced ectopic gestation, and in cases where the diagnosis is not reasonably certain.

The advantages claimed are:—The absence of risk of a ventral hernia; there is no handling of the intestines, or what I believe is still worse, rubbing of the delicate endothelium with gauze sponges; the very much slighter shock of operation; absence of the distressing thirst so commonly seen even after an exploratory abdominal section; and, lastly, the much more rapid convalescence.

There is no doubt that in operating by the vagina the time occupied is much longer than if the abdominal route was followed, but with a good anæsthetist I consider this to be a matter of little moment. I think that in the majority of the affections I have mentioned the advantages of vaginal cœliotomy outweigh the disadvantages, and that the question an operator should ask himself is not "How shall I do this?" but "Can this be done by the vagina?"

I feel that this subject has been treated in a very imperfect manner; but as a long paper might be written on each of the many conditions for which vaginal cœliotomy would be suitable, I have found it impossible to do more than treat the subject as a whole.

Dr. F. W. Kidd said that in some cases it is absolutely impossible to diagnose whether one is dealing with a single or a double salpingitis. As regards the removal of small subserous fibromata when the uterus is taken down, he said it was his experience to meet with a lot of these which never did the patient the slightest harm. It has been claimed that intestinal adhesions can be dealt with easily by colpotomy, and that the intestines never come into view; but there were a good many cases of intestinal adhesions when, if one were unfortunate enough in bringing them down so as to injure the intestines or the vermiform appendix, such cases would likely have to be finished by the abdominal method.

Dr. A. J. Smith did not think it the correct operation for ruptured tubal pregnancy, as a large blood-clot sometimes extended up to above the umbilicus, and he thought that this clot could not be as efficiently removed as by the abdominal method. He thought

that for prolapsed ovaries and catarrhal tubes it was a matter of slight difference whether the abdomen was opened from below or above.

Dr. Henry Jellett thought that enough importance was not given to vaginal cœliotomy as a means of diagnosis pure and simple. In certain cases of dysmenorrhœa, where it is ovarian, he thought it was justifiable to examine the ovaries if any sign of pathological condition could be obtained by a bi-manual examination.

Dr. Smyly—When posterior or anterior colpotomy should be performed depended upon the circumstances of the case, whether the uterus was ante-verted or retro-verted, and where the pathological condition was situate. He did not approve of Dührssen's method of anterior colpotomy, but of Mackenrodt's. As regards vaginal fixation he did not altogether agree with Dr. Wilson; he did not think it a good method for ruptured tubal pregnancy on account of the difficulty in knowing when all the clots were cleared away. He had performed the operation for ovarian tumour for pyosalpinx in several cases, and for ruptured tubal pregnancy. With regard to pyosalpinx he said that the uterus is really infected before the tubes, and unless the uterus is removed the disease is not cured.

Dr. R. D. Purefoy thought that vaginal colpotomy was very suitable for small movable tumours, whatever their origin. He was of opinion that it was not as good as laparotomy for most cases of pyosalpinx and tubal pregnancy. Sometimes the operation was very troublesome. He was quite unable to accept the proposition that in every case of pyosalpinx the uterus should be removed.

Dr. Winifred Dickson thought it a great advantage not to have an abdominal incision.

Dr. Wilson, in reply to Dr. Kidd, said that he was far from saying that every time a fibroma or myoma was diagnosed a colpotomy should be done. It was not always the size of a myoma which caused the symptoms. The vermiform appendix is often seen in operations by the vagina, and may be taken out and put back without danger. Adhesions of the intestines to the uterus, ovaries, and tubes could be easily separated. He (Dr. Wilson) thought Dührssen's method very bad, and Mackenrodt's nearly as bad. If the fundus was not brought through the peritoneum most probably the operation would be a total failure and the fundus would subsequently retrovert. He did not think with Dr. Smyly that an abdominal

section should be done to separate adhesions preparatory to removal of double pyosalpinx by the vagina. He believed that it was in separating the tubes from their adhesions that they burst. With reference to prolapse operations he thought that perhaps extirpation was the best method in elderly women. For younger women he thought that an anterior and posterior colporrhaphy and a properly fitting pessary was best.

CLINICAL REPORT OF THE ROTUNDA LYING-IN HOSPITAL FOR THREE YEARS, FROM NOVEMBER 1, 1893, TO OCTOBER 31, 1896.

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H. Wilson, L.R.C.S.I., and Henry Jellett, M.D., M.Ch.,
Assistants.

[Read in the Section of Obstetrics, March 18, 1898.]

During the three years

4,006 women were confined in the Hospital,
6,273 ,, ,, at their own homes.

Total, 10,279

Of the 4,006 patients delivered in the hospital 14 died, or 0·374 per cent.

ABORTIONS.

There were 134 abortions, with 2 deaths. The preventive treatment of abortion was limited to rest in bed, hydrastis canadensis for hæmorrhage, and opium for pain; no alteration was made in their beds or coverings. We did not give them cold food, nor apply cold to the vulva or hypogastrium, nor was ergot administered. We did not interfere because abortion appeared inevitable, but, unless there were special indications, the case was left to nature. When hæmorrhage was severe we found, with one exception, that the os was sufficiently dilated to remove the ovum. The plug was never employed where any

portion of the ovum had escaped; in such cases we followed the same rule as in delivery at term—*i.e.*, we waited half an hour, and if the remainder were not expelled spontaneously we removed it. Thus 55 cases terminated without assistance; in 1 case the vagina was plugged in the hospital, because though hæmorrhage was severe the os would not admit a finger; and 2 were admitted with vaginal tampons. The uterus was plugged after curetting in 2 cases—once for hæmorrhage and once for putrefaction. In 5 cases the hot douche only was employed; in 8 compression of the uterus between the fingers of one hand in the vagina and those of the other upon the hypogastrium sufficed; in 11 the finger was introduced to detach portions of the ovum; and 50 were curetted.

E. H., aged twenty-seven, 5-para; admitted Oct. 1, 1894; six months pregnant. Patient, who had been sent up from the country, had suffered for a whole month from severe and repeated hæmorrhages, and had been repeatedly plugged. On admission she was in a state of profound anæmia. A plug was removed from the vagina, which was then scrubbed thoroughly with creolin lotion, and upon examination the os was found closed. During the next four days there was no hæmorrhage, and every effort was made to improve her condition. On the fifth day hæmorrhage recommenced, and two laminaria tents were introduced into the cervix, and the vagina was plugged. During the night her temperature rose to 103·5°, but in the morning had fallen to 101·2°. She then complained of labour pains, but she became exhausted and died undelivered.

A. C., four and a half months pregnant; incomplete abortion; admitted with septic fever, of which she died on the twentieth day. Her case is reported under that heading.

Another case had been plugged outside. On admission her temperature was 101°, and pulse 120. The tampon was immediately removed, the vagina and uterus thoroughly douched out, and the latter curetted. The next evening her temperature rose to 103·4°, but fell the following morning, and though it continued somewhat irregular it never rose again above 101°. She left the hospital against our advice on the eighth day.

Table I., *showing nature of Cases in Rotunda Lying-in Hospital.*

—	1893-94	1894-95	1895-96	Total	—
Total number of cases	1,316	1,267	1,423	4,006	
Primiparæ	487	430	503	1,420	1 in 2·8
Abortions	50	40	44	134	1 in 29·8
Hyperemesis	1	1	1	3	1 in 1,335
Hydramnios	2	3	2	7	1 in 572
Myxoma chorii	1	1	—	2	1 in 2,003
Face to pubes	3	1	17	21	1 in 191
Face	4	6	2	12	1 in 334
Brow	1	2	1	4	1 in 1001·5
Breech and lower extremities	23	49	53	125	1 in 32
Shoulder and upper extremities	7	3	4	14	1 in 286
Twins	14	12	19	45	1 in 89
Triplets	—	—	1	1	1 in 4,006
Prolapse of funis	8	4	7	19	1 in 211
Placenta prævia	8	14	9	31	1 in 129·5
Accidental hæmorrhage	11	5	4	20	1 in 200
Post-partum do.	14	18	17	49	1 in 82
Prolapse of cervix	1	—	—	1	1 in 4,006
Rupture of uterus	—	1	—	1	1 in 4,006
Labial thrombus	—	—	2	2	1 in 2,003
Retained placenta	10	10	15	35	1 in 114·5
Ovarian tumour	—	—	1	1	1 in 4,006
Myoma uteri	1	5	2	8	1 in 500
Pelvic deformity	7	7	7	21	1 in 191
Induction of labour	3	7	3	13	1 in 308
Turning	14	16	12	42	1 in 95
Forceps	41	32	44	117	1 in 34
Perforation	—	1	2	3	1 in 1,335
Cæsarean section	1	—	—	1	1 in 4,006
Panhysterectomy	1	—	—	1	1 in 4,006
Symphysiotomy	—	—	1	1	1 in 4,006
Eclampsia	5	1	3	9	1 in 445
Insanity	—	—	3	3	1 in 1,335
Deaths	7	6	1	14	1 in 286
Morbidity	59	69	44	172	1 in 23
Children—					
Spina bifida	1	—	1	2	1 in 2,003
Anencephalous	—	2	3	5	1 in 801
Hydrocephalous	2	—	2	4	1 in 1001·5

PROLAPSE OF FUNIS.

There were 20 cases of prolapse of the funis. Two were complicated by placenta prævia, and one was the second of twins; eight children were stillborn, in three of whom the cord was pulseless when discovered, and one of these children was macerated. All the mothers recovered.

Name	Age	Para	Date	Pres.	M.	C.	—
1. M. B.	29	4	January 9, 1894	V.	R.	A.	External version; extraction.
2. B. S.	25	5	Feb. 28,	V.	R.	A.	Combined version.
3. M. C.	30	2	March 12,	V.	R.	D.	Forceps.
4. M. B.	36	3	May 13,	Breech	R.	D.	Placenta prævia; foot brought down.
5. M. D.	19	1	July 20,	Foot	R.	A.	Extraction.
6. B. R.	29	3	Aug. 5,	V.	R.	A.	Reposition.
7. M. B.	23	5	Sept. 9,	Breech	R.	D.	Cord pulseless; nothing done.
8. L. C.	23	1	Sept. 24,	Breech	R.	D.	Twins: 1 vert. alive; 2nd, breech, cord pulseless.
9. A. S.	30	1	Jan. 29, 1895	V.	R.	A.	Combined version.
10. M. A. F.	40	6	March 27,	Oblique	R.	A.	Internal version.
11. C. J.	33	9	March 29,	V.	R.	D.	Do. do.
12. A. S.	36	2	May 20,	Oblique	R.	A.	Do. do.
13. M. A. B.	35	10	Dec. 28,	Breech	R.	A.	Extraction.
14. R. B.	22	2	Jan. 3, 1896	V.	R.	A.	Nothing; labour rapid.
15. J. O'D.	34	5	Feb. 14,	V.	R.	D.	Combined version.
16. J. D.	33	3	April 28,	V.	R.	D.	Cord pulseless; nothing done.
17. K. M.	27	4	July 30,	V.	R.	A.	Nothing done; rapid delivery.
18. M. B.	35	5	July 9,	V.	R.	A.	Symphysiotomy; version.
19. K. F.	22	1	Aug. 20,	V.	R.	D.	Cord pulseless; nothing done.
20. M. D.	30	5	Oct. 19,	Foot	R.	A.	Slight accidental hæmorr., memb. ruptured, cord prolapsed; extraction.

HYPEREMESIS.

There were 3 cases of uncontrollable vomiting, all of which terminated fatally.

K. K., aged thirty-seven, 7-para, admitted from extern maternity, August 15, 1894. Patient was very emaciated, and exceedingly weak from constant and uncontrollable vomiting. It was determined to induce labour as quickly as possible, and two bougies were inserted between the membranes and uterine wall. Pains set in in six hours, the breech presenting. As soon as the os was sufficiently dilated a foot was brought down, and a premature child weighing 4½ lbs. extracted alive. After delivery vomiting continued, and in spite of nutrient enemata she gradually grew weaker, her temperature steadily falling from 97° at the time of the child's birth to 95° on the fourth day, when she died. The *post-mortem* showed some inflammation of the stomach, but all other organs healthy.

C. H., aged thirty, 3-para, admitted June 24, 1895, from Steevens' Hospital in a very emaciated condition, with history of constant vomiting for past six weeks. Urine highly albuminous, contained tube casts. The vomiting ceased on July 1, but she gradually became weaker. Labour set in on the 3rd, and she was delivered in a quarter of an hour, but died eighteen hours after. *Autopsy.*—Old pleuritic adhesions; dilated stomach; large white kidneys.

M. B., aged twenty-nine, 7-para, seven months pregnant, admitted October 11, 1895, with advanced kidney disease. History of constant vomiting for past five months; patient deeply jaundiced, liver enlarged, uræmic breath, no œdema, urine dark-coloured, highly albuminous, contained bile pigment. October 12.—Uræmic convulsions, gradually became comatose, and died undelivered the following morning. *Autopsy.*—Large fatty liver; large white kidneys.

HYDRAMNIOS.

There were 7 cases of hydramnios, in 2 of which the children were anencephalic, 1 had spina bifida, and a fourth was œdematous. One patient was so enormously distended that she suffered from intense dyspnœa, which was immediately relieved by the escape of the waters.

ABNORMAL PRESENTATIONS.

Face to Pubes.—Twenty-one cases were noted, but

as it was not necessary to report this abnormality to the medical officers the record is not reliable.

Face.—Twleve cases.

Brow.—Four cases. Two terminated as such, one changed into a face, and the fourth was converted into a vertex. The head being freely movable above the brim, the hand was introduced and the occiput brought down. Labour was completed by the natural efforts.

Breech and Lower Extremities presented 125 times. Twice a leg was brought down to hasten delivery; 15 times the arms were extended above the head and had to be brought down. The posterior arm was always delivered first, and in most cases the child was rotated so as to turn the other arm into the hollow of the sacrum before it was delivered. When the delivery of the head required assistance it was generally accomplished by the Prag, Smellie's or Martin's method, most frequently by a combination of the two latter; once only were forceps applied to the after-coming head, but without success, and the child having died it was perforated. Forty-one children were stillborn, of which 12 were macerated, and 4 died in the hospital.

Shoulder and Upper Extremities.—Fourteen cases. All the mothers and 9 of the children survived. In 3 external, in 6 internal, and in 3 bi-polar version was performed; 1 was decapitated, and 1, a small and macerated fœtus, was expelled spontaneously.

M. C., aged thirty-seven, 2-para, admitted January 16, 1894, Had been twenty hours in strong labour before admission. The child was lying obliquely with its head in the left iliac fossa, the right shoulder impacted in the pelvis, and the arm prolapsed and swollen. There was no fœtal heart, and the contraction ring could be easily felt above the fœtal head. The child was decapitated with Braun's hook. The mother made a good recovery.

TWINS.

There were 45 twin births. The majority required no assistance. In one case the hand and non-pulsating cord prolapsed; they were replaced. The head of the other child came down, and labour terminated by the natural efforts. In another a hand and foot presented, but when the membranes ruptured a head and arm came down, and the labour terminated without difficulty. In one case forceps was applied, and in one in which there was also placenta prævia version was performed.

Presentations.

Both vertex - - -	16
Vertex and breech - - -	15
Breech and vertex - - -	10
Face and breech - - -	1
Vertex and face - - -	1
Both breech - - -	2
	45

Sexes of Children.

Both male - - -	16
,, female - - -	20
Male and female - - -	9
	45

TRIPLETS.—One case.

PLACENTA PRÆVIA.

There were 31 cases of placenta prævia. Ten children were born alive, and 22 dead. All the mothers recovered. In 4 cases no treatment was required; in 5 rupture of the membranes was sufficient; in 20 a foot was brought down and delivery left to the natural efforts. In order to bring down the foot in 18 of these cases, version was necessary—in 2 external version; in 2 internal; and in 14 bi-polar version was performed. One case was delivered with forceps.

NAME	Variety	Result to Child	Presentation	Treatment
E. O. T.	Marginal	D.	Vertex	Membranes rupt.
M. K.	Do.	A.	Oblique	Internal version
E. W.	Lateral	A.	Vertex	Bi-polar do.
M. C.	Marginal	A.	Do.	Forceps
H. C.	Lateral	D. D.	Both vertex	Membranes rupt.
L. M.	Marginal	D.	Do.	Do. do.
M. K.	Central	D.	Do.	Bi-polar version
B. B.	Marginal	A.	Do.	Nil
L. S.	Do.	A.	Do.	Nil
M. B.	Lateral	D.	Do.	Bi-polar version
M. H.	Marginal	A.	Do.	Membranes rupt.
E. R.	Do.	D.	Do.	Bi-polar version
C. R.	Do.	D.	Breech	Nil
J. D.	Lateral	D.	Vertex	Bi-polar version
J. C.	Do.	D.	Do.	Internal do.
B. McK.	Do.	D.	Do.	External do.
M. M.	Marginal	D.	Do.	Membranes rupt.
J. S.	Central	A.	Do.	Bi-polar version
M. O'B.	Do.	D.	Breech	Foot brought down
E. F.	Lateral	A.	Vertex	External version
M. B.	Do.	D.	Do.	Bi-polar do.
A. F.	Do.	D.	Do.	Do. do.
E. P.	Central	D.	Vertex	Bi-polar version
M. B.	Do.	D.	Foot	Foot brought down
L. W.	Lateral	A.	Transverse	Bi-polar version
K. H.	Marginal	D.	Vertex	Do. do.
W. O'B.	Central	D.	Do.	Do. do.
K. P.	Do.	D.	Do.	Nil
M. H.	Lateral	A.	Do.	Bi-polar version
G. O'D.	Marginal	D.	Do.	Do. do.

E. W., aged thirty, 4-para, admitted Jan. 29, 1894. She had had hæmorrhage for five days before admission, and on the 28th it was very profuse. The medical practitioner who was called in plugged the vagina and sent her into hospital. On admission she was very anæmic, pulse 130, temperature 101°. She had also constant vomiting, so that she could retain no food. Her condition was so critical that in spite of her high temperature we did not consider it advisable to remove the plug immediately, but directed our efforts to stopping the sickness and restoring her vitality. After two hours the plug was removed, the vagina disinfected, bi-polar version performed, and a foot brought down. Labour did not set in for nineteen hours. She was then rapidly delivered of a child in a state of pallid asphyxia, which was brought round by Schultze's method, and left the hospital with its mother.

M. C., aged thirty, 2-para, admitted March 2, 1894. Slight hæmorrhage from marginal placenta prævia, which ceased when the membranes were ruptured; cord prolapsed and ceased pulsating, child rapidly delivered with forceps; heart pulsating, but all efforts failed to resuscitate it.

H. C., aged thirty-one, 3-para, admitted June 23, 1894. Was sent into hospital by a doctor who had separated the placenta from the lower zone of the uterus by Barnes's method, but had not ruptured the membranes. On admission the hæmorrhage was profuse; pulse, 120; T. 99°; os somewhat larger than a shilling. The vagina having been douched with hot creolin solution, the membranes were ruptured. Hæmorrhage immediately ceased, and she was left to deliver herself. The child was dead.

There was no maternal death.

ACCIDENTAL HÆMORRHAGE.

There were 20 cases of accidental hæmorrhage, 8 of which were severe. In 12 cases nothing was required to check the hæmorrhage beyond a hot douche and rupture of the membranes. In 4 the vagina was plugged, in 3 version was performed, and 1 was delivered with forceps.

A. E., aged forty, admitted Nov. 2, 1894. Patient was seven months pregnant, and had suffered from severe flooding before admission. There were no labour pains, and the os would only admit the tip of one finger. The vagina having been douched

with hot creolin solution was plugged with gauze and moist cotton-wool. When the plug was removed, 24 hours later, the os was found the size of a crown piece, and during the examination it was retracted beyond the reach of the finger. The membranes were ruptured, and in a few minutes a dead child was expelled. The woman declared that she was unconscious of pain during delivery. She made a good recovery.

E. S., aged twenty-nine, 5-para, admitted Dec. 6, 1894, with severe flooding; the os was undilated, and there were no labour pains. The vagina was douched and plugged as in the former case. Pains set in in about four hours. The plug was removed and the membranes ruptured. A dead child was shortly afterwards expelled.

W. D., aged twenty-five, 4-para, admitted 18th March, 1895. In this case the hæmorrhage commenced after rupture of the membranes. Labour pains were strong, but the flooding was very profuse. She became very anæmic, with a pulse of 122. The head being well in the cavity of the pelvis and the os nearly dilated, the forceps was applied, and a dead child, weighing 9 lbs., extracted. An examination of the after-birth showed that the placenta had been situated in the upper zone of the uterus.

M. S., aged thirty, 2-para, admitted Aug. 14, 1895. Had had severe hæmorrhage before admission, and internal version had been attempted outside; the os was about the size of half-a-crown, and a foot was in the vagina, but the head was still in the brim. Version was completed by pushing up the head, and strong pains setting in a living child was born in two and a half hours.

POST-PARTUM HÆMORRHAGE.

There were 49 cases of post-partum hæmorrhage, 28 of which were moderate and 21 severe; 41 were due to uterine inertia, 7 to lacerations of the soft parts, and 1 to a combination of both causes. Of the atonic cases, 10 were controlled by external manipulation and ergot, 6 by the hot douche; in 24 the hand was introduced to remove the placenta, membranes, or clots, 3 were plugged, including a case of uterine inertia with a deep cervical laceration, 2 were infused with saline solution.

M. C., delivered 15th July, 1894. Considerable post-partum hæmorrhage; hand introduced and partially adherent placenta removed, uterus continuing relaxed and a deep cervical laceration being discovered, uterus and cervix were plugged with gauze.

N. F., delivered 9th Feb., 1895. A considerable hæmorrhage during third stage. Hæmorrhage ceased after expulsion of the placenta, but the patient was greatly collapsed, with a thready pulse, 140 per minute; as she did not improve with the ordinary methods, two quarts of saline solution were infused with marked benefit. She left the hospital on the ninth day.

H. S., delivered 22nd Jan., 1895, at 2 30 a.m., of a seven months' child. There was some hæmorrhage after the birth which was easily controlled, but at 3 30 a.m. flooding was noticed again; a large quantity of blood and clots was expressed from the uterus, with a piece of membrane. Hot douching being found insufficient, the uterus was plugged with gauze and the vagina with moist cotton wadding. The patient was greatly collapsed and could retain nothing in her stomach. As her condition showed no improvement towards evening she was infused with saline solution; the pulse, which could not be counted before, now fell to 126. The plugs were removed at 12 30 p.m., and there was no further hæmorrhage. On the fourth evening her temperature rose to 104° and the uterus was douched with creolin. The temperature continued irregular for four days, but steadily improved after that until the twelfth day, when it became normal and remained so until her discharge five days later.

M. K., delivered 17th May, 1895. The membranes were adherent and had to be removed by hand. The uterus was infested by a number of multi-nodular myomata. Hæmorrhage continuing in spite of hot douching the uterus and vagina were plugged with gauze as in the former cases. She had an irregular temperature for three weeks, but only once as high as 101°, and she ultimately left the hospital in good health.

Of the 7 traumatic cases 2 were due to laceration of the cervix, 3 were due to a tear in the vestibule, 1 to a deep vaginal laceration, and 1 to laceration of the perineum. They were all sutured. There was no maternal death.

RUPTURE OF THE UTERUS.

There was one example of this accident.

M. K., aged twenty-eight, 5-para, admitted 6th June, 1895, at 7 30 a.m. Labour had commenced at 6 a.m., and she had strong pains. At 11 45 a.m. the os was fully dilated; some blood had escaped per vaginam during the previous half hour, but ceased after rupture of the membranes. When six hours in the second stage forceps were applied, and a dead child delivered. The uterus contracted firmly, but failed to expel the placenta. All efforts to express it having failed, after fifty minutes the hand was introduced, and a laceration through the lower uterine segment and cervix was discovered in the posterior wall, through which the placenta had escaped into the abdominal cavity. Following the cord the hand was passed through the rent, and the placenta removed. A strip of iodoform gauze was passed through the tear, and left there for two days. That evening her temperature reached 101·2°, but was normal next morning. In the evening it was again 101°, and pulse 120. Next morning both had fallen to normal, and continued so until she was discharged on the 20th.

OVARIAN TUMOUR.

The cystic tumour, which was somewhat larger than the fœtal head, was easily pushed up out of the pelvis at the commencement of labour, and gave no further trouble.

MYOMATA.

H. S., aged forty-four, 3-para, admitted 28th April, 1894; nineteen years since birth of last child; uterus infested with multinodular myomata; labour very tedious; a large submucous myoma almost closed the os. The hand was passed into the vagina and two fingers into the uterus beyond the tumour. A foot, which fortunately was the presenting part, was seized, and by means of it extraction was effected with considerable difficulty. The child, which was macerated, weighed 7¼ lbs. The mother made a good recovery.

E. B., aged thirty-eight, 1-para, admitted 12th February, 1894. Upon abdominal examination the uterus was found infested with myomatous nodules, the fœtus presenting in the second position, with the head freely movable above the pelvic brim. Per vaginam, a tumour as large as a fœtal head was

found occupying Douglas's pouch, and encroaching upon the conjugate diameter to such an extent as to render the passage of the child impossible. The tumour was firmly fixed, so that it could not be pushed up out of the pelvis, nor could the presenting part be reached by the examining finger. Abdominal section was performed on Friday, May 4th, the uterus was drawn out and opened. The fœtus extracted began to cry almost immediately. The removal of the tumour was difficult owing to firm adhesions of its upper third, which was covered with peritoneum, and to the extra-peritoneal development of the lower two-thirds, necessitating careful enucleation. An elastic ligature was placed around the cervix below the tumour, and the latter, with the uterus, removed. The cervix was then extirpated per vaginam, the broad ligaments having been secured by clamps. A large mass of tissue was then found outside the clamp on the left side; it was drawn down, another clamp placed outside, and the mass removed, and upon examination was found to be a second uterus, which admitted a sound to the normal depth (the specimens were exhibited at the meeting of the Obstetrical Section of the Royal Academy of Medicine, Ireland, on Friday, May 18, 1894). Convalescence was delayed by thrombosis of the short saphenous vein of the left leg, but she ultimately left the hospital, with her infant, in good health.

Of the other cases 2 were subperitoneal myomata, which caused no trouble; 3 were interstitial multinodular myomata. Two of these women aborted, and 1, M. K., has been already reported as a case of post-partum hæmorrhage, and 1 with a submucous tumour aborted at the third month.

DEFORMED PELVIS.

Twenty-one cases were reported, 2 of whom delivered themselves without assistance; 1 in which the child presented with breech required manual assistance; 4 were extracted with forceps, once the instrument was applied before the head had passed the brim, and three times for secondary inertia after it had entered the pelvic cavity; 9 were delivered after induction of premature labour, 3 by craniotomy, 1 by symphysiotomy, and 1 by Cæsarean section. Two mothers and 7 children died.

Name	Age	Para	Delivered	M.	C.	——
A. K.	28	5	17 Jan., 1894	R	A	High forceps
M. B.	33	4	26 Feb., ,,	R	A	Induction of labour
K. M.	36	6	14 March, ,,	R	A	Do. do.
N. C.	42	8	31 March, ,,	R	D	Low forceps
M. K.	28	4	1 June, ,,	R	D	Perforation of after-coming head
A. B.	29	5	5 August, ,,	R	D	Low forceps
J. S.	28	2	28 Oct., ,,	D	A	Cæsarean section
E. W.	37	9	23 Jan., 1895	R	A	Induction of labour
B. S.	27	5	3 Feb., ,,	R	A	Breech
K. M.	36	6	15 March, ,,	R	A	Induction of labour
M. K.	33	10	9 May, ,,	R	A	Do. do.
B. H.	26	4	4 June, ,,	R	D	Perforation
A. B.	40	9	15 Sept., ,,	R	A	Low forceps
M. D.	27	4	16 Sept., ,,	D	A	Induction of labour
E. M.	25	6	7 March, 1896	R	D	Do. do.
M. E.	25	4	9 March, ,,	R	A	Natural efforts
K. K.	33	4	15 May, ,,	R	D	Induction of labour
E. A.	23	4	17 June, ,,	R	A	Do. do.
M. B.	25	5	9 July, ,,	R	A	Symphysiotomy
M. N.	23	3	19 Aug., ,,	R	A	Natural efforts
S. K.	28	1	15 Oct., ,,	R	D	Perforation

Case I.—A. K., aged twenty-eight, 5-para, admitted Jan. 17, 1894. Patient had been a long time in labour; waters had escaped 18 hours before admission, meconium escaping. The contraction ring was high up, and head above the brim. Fœtal heart slow; os ¾ dilated; large caput succedaneum; conjugate of brim, 3¾ inches. A living child was extracted with considerable difficulty by forceps.

Case V.—M. K., aged twenty-eight, 4-para, admitted 31st May, 1894. Her first two labours were terminated by craniotomy; the third, in the Rotunda Hospital, by induction of premature labour, and that child was still living. Although warned of the dangers attending delivery at term, she now presented herself in labour at full term, the breech presenting. All efforts to deliver the after-coming head were fruitless until after the child's death, when it was perforated and extracted.

Case VII.—J. S., aged twenty-eight, 2-para. This patient had been delivered in the hospital by Cæsarean section in 1891. The conjugate of the brim measured $2\frac{3}{4}$ inches, and the transverse $4\frac{1}{4}$ inches. It was therefore a generally contracted flat pelvis. She was admitted to the Lying-in Hospital on Sunday, October 28th, 1894, having been some hours in labour. The operation was commenced late in the afternoon, and had to be finished by lamp-light, and to this I attribute the unfortunate result. Upon opening the abdomen the intestines were found adhering to the uterine cicatrix, and were pushed off with a muslin compress. The uterus was then opened, the child extracted, and the cord ligatured and divided. It was a male weighing six and a half pounds, and began to cry immediately. The placenta and membranes were removed, and the wound closed with silk sutures. The intestines were carefully examined, but a small pin-hole opening was not discovered until the *post-mortem* examination. The abdominal wound was closed, and the patient put to bed. She died on the third day from escape of fæcal matter into the abdominal cavity; the child survived.

Case XII.—B. H., 4-para, admitted 16th May, 1895. May 29, bougies inserted and changed daily until June 2. Barnes's bags were then inserted and the os dilated. June 3, membranes ruptured. Next morning the head was still above the brim, the contraction ring a hand's breadth above the pubes, no fœtal heart, meconium coming away, large caput succedaneum. Version being impossible, and the child evidently dead, the head was perforated and extracted with Anvard's cranioclast. The placenta was adherent and had to be removed manually. She made a good recovery.

Case XIV.—M. D. died of septicæmia and is reported under that heading.

Case XVII.—K. K., first two children stillborn, three craniotomised, c.v. 9 cm. Labour induced by Krause's method; labour did.

not set in for some days; pains infrequent and inefficient; podalic version; child astride the cord; died during extraction.

CASE XIX.—M. B., 5-para. Her first three children were still-born, probably perforated, but of this she was uncertain. The fourth was saved by induction of labour in this hospital. She was now at full term. When the os was nearly dilated symphysiotomy was performed, the funis prolapsed, when the membranes ruptured. The child was turned and extracted without much difficulty; she made an excellent recovery. There was no abnormal mobility of the symphysis, and no trouble in walking. She left the hospital with her baby in excellent health on the 29th of August.

CASE XXI.—S. K., aged twenty-eight, 1-para. On admission os size of half-crown. Large caput succedaneum on head which was freely movable above the brim; promontory easily felt, c.v. 7 cm.; waters had long escaped; meconium coming away; no fœtal heart; perforation.

LABIAL THROMBUS.

There were two cases:—

CASE I.—E. B., aged twenty-three, 1-para, admitted Feb. 4, 1895. Labour commenced at 6.30 p.m. on the 3rd. At 10 a.m. next day a swelling was noticed in the left labium, which rapidly increased in size until it was as large as a fœtal head, distending the labium, bulging the vaginal wall inwards, and extending across the perineum. She was immediately sent into hospital and delivered with forceps. During delivery the tumour ruptured, and the perineum was lacerated. The rent extended up the vaginal wall almost to the lateral fornix; two large veins were ligatured, and the cavity plugged with iodoform gauze, which was removed after twenty-four hours; she made a good recovery.

CASE II.—M. M., aged thirty-four, 7-para, admitted August 31, 1896. She was delivered naturally. Shortly after delivery she complained of very severe bearing down pain, "just like the head coming through." The left labium was swelled to the size of a turkey's egg, the inner aspect of a dark purple colour, and very tender to the touch. A ¼-grain of morphia was given hypodermically, and a compress applied to the vulva. Next morning the tumour had increased in size, and at 12 30 it burst with profuse hæmorrhage; the rupture was found on the inner side of the labium. The cavity was freely laid open, clots turned out, and

some bleeding points secured by suture. It was then well washed out with hot creolin lotion, and plugged with iodoform gauze; the vagina was also plugged with gauze and moist cotton wool, and a large pad applied to the vulva and secured by a T bandage. The patient, who was very collapsed, was treated by a hypodermic injection of strychnia, hot nutrient enema, and raising of the foot of the bed. She made a good recovery, and left the hospital in good health, excepting phthisis pulmonalis, from which she had previously suffered.

FORCEPS.

Forceps were used in 117 cases—*i.e.*, once in 34 deliveries. The indications for their use were as follows:—

	1893–94	1894–95	1895–96
Delay in second stage -	30	27	41
Rise in temperature - -	1	1	0
Rise in pulse - -	0	2	1
Slowing of fœtal heart -	8	1	2
Prolapse of funis - -	1	0	0
Accidental hæmorrhage -	1	1	4
	41	32	40

Of these 87, or nearly three-fourths, were primiparæ. The ages of the primiparæ were:—

Between 17 and 25 years -	29
25 „ 30 „ -	36
30 „ 35 „ -	19
35 „ 43 „ -	3

In one case only was the instrument used before the head had passed the brim of the pelvis—that is, one high forceps in 4,006 deliveries; it is reported under pelvic deformity. Two mothers died—1 in 2,003.

CRANIOTOMY.

Three children were perforated; they were all dead, and have been reported under cases of pelvic deformity.

VERSION

Was performed 42 times—12 times for shoulder presentations, 18 times for placenta prævia, twice for accidental hæmorrhage, twice for pelvic deformity, and 8 times for prolapse of funis.

ECLAMPSIA.

There were nine cases of eclampsia, five of which were ante-, two intra-, and two post-partum. Three of the mothers and four of the children died. One of the mothers went out undelivered and did not return.

Name	Age	Para	Delivered	M.	C.	Time of Onset
C. T.	34	6	4 Feb., 1894	R	D	Ante-partum
M. M.	28	1	5 April, ,,	R	D	,,
E. B.	33	1	24 Oct., ,,	R	?	,,
M. H.	19	1	23 Dec., ,,	D	A	Post partum
E. S.	—	—	Not	D	—	Ante-partum
M. B.	29	3	12 Oct., 1895	D	D	,,
S. M.	28	1	28 April, 1896	R	A	Intra-partum
E. C.	17	1	27 May, ,,	R	A	Post-partum
K. W.	35	5	10 July, ,,	R	D	Intra-partum

Case I.—C. T., aged thirty-five, 6-para, admitted January 13, 1894, in convulsions. Urine scanty, contained blood, and became almost solid on boiling. Between the fits she was semi-conscious, restless, and rambling. An enema was administered, and ½ grain morphia hypodermically. She had four fits during the following four hours when another ½ grain morphia was administered, after which she slept soundly for some hours. She regained consciousness next day and had no more fits; was kept on milk diet until the 18th, when she left the hospital. She was re-admitted on the 4th of February, and was delivered by the natural efforts of a macerated fœtus which presented with the breech. She made a good convalescence, and was discharged on the 10th.

Case II.—M. M., aged twenty-eight, 1-para, admitted March 31, 1894. She had had five fits before admission. Her urine contained blood and a large quantity of albumen. Half a grain of morphia was administered hypodermically and repeated every fourth hour until she had had gr. 1½. Labour did not set in until mid-day on April 5th, and she was delivered after seven hours of a dead macerated fœtus. In the meantime she had been restricted to milk and had no more convulsions.

Case III.—E. B., aged thirty-three, 1-para, admitted 27th September, 1894, in convulsions. She was six months pregnant, and her urine was scanty and highly albuminous. She was given mist. sennæ co. ʒiij., and when the fits recurred, morphia ½ gr., which was repeated in four hours. She had no more fits, and having been kept for three weeks on milk diet, she went out undelivered, and did not return.

Case IV.—M. H., 1-para, aged nineteen, admitted 23rd December, 1894, and was delivered, after nineteen hours, of a living child. Her urine was highly albuminous. Next morning she was seized with a violent eclamptic fit, and was given morphia ½ gr. She had four more fits before 3 p.m., when she got another ½ grain of morphia, after which she had no more fits. At 12 30 a.m. her temperature began to rise; at 2 a.m. it was 102°, and at 6 a.m. 104°. She discharged a large quantity of fœtid pus through her mouth and nose, became comatose, and died at 8 30 a.m. Unfortunately a *post-mortem* examination could not be obtained.

Case V.—E. L., admitted Feb. 9, 1895. Had had several convulsions, was comatose on admission, and died two hours after undelivered.

Case VI.—M. B., aged twenty-nine, 3-para, admitted October 11, 1895. Seven months pregnant; advanced Bright's disease; had had severe vomiting for past five months; was greatly emaciated; no œdema of feet or legs; urine dark-coloured, half albumen, contained bile pigment. The liver was enlarged, and the breath had a urinous odour. Convulsions set in at 5 p.m. on October 12. She was given a hot bath and ol. crotonis 1 gr. She had another fit at 11 p.m., when she got ½ grain of morphia. She became comatose, and died at 2 45 the next morning undelivered.

Case VII.—S. M., aged twenty-eight, 1-para. On admission (April 26, 1896) her feet and legs were very œdematous; urine contained a large quantity of albumen; was given mist. sennæ co. ʒii. At 12 25 a.m. on the 26th she had an eclamptic fit, and was

given ½ grain of morphia. She had four fits before 4·20, when the morphia was repeated. She had two fits before 10 a.m., when she got a third dose of morphia, ¼ grain. After this she had no more fits. The child was born alive at 2 50 p.m., and both left the hospital on the seventh day.

CASE VIII.—E. C., aged seventeen, 1-para, admitted May 26, 1896. Was delivered at 2 50 of a living child, after a natural labour of seven hours. Urine scanty, dark coloured, highly albuminous. She was given pulv. jal. co. ʒi., with calomel gr. 5. At 6 45 a.m. the next morning she had an eclamptic seizure, and was given morphia. She had a second at 7 5, after which she had no more, and made a good recovery.

CASE IX.—K. W., aged thirty-five, 5-para, admitted July 18, 1896, in the second stage of labour. Two hours after admission had an eclamptic seizure. Forceps were applied, and a dead child was extracted. The urine was examined, and found to contain blood and a large quantity of albumen. She made a good recovery.

MORBIDITY.

There were 172 cases in which the temperature rose above 100·8° F.—*i.e.*, 1 in 23·2.

There were 2 cases of physometra, the result of ante-partum putrefaction, one of which died.

TABLE *showing number of Cases with rise of Temperature above* 100·8° F.

—	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	—
100·8° but under 102·2°	1	3	4	3	–	3	–	6	1	5	4	3	1893-4
	5	9	4	4	3	5	1	5	5	4	1	1	1894-5
	1	–	3	3	4	1	4	4	1	–	2	3	1895-6
102·2° but under 104°	4	3	2	–	1	1	1	2	–	1	5	2	1893-4
	1	2	–	1	4	1	–	2	–	1	–	1	1894-5
	–	3	2	4	1	–	–	–	2	2	2	–	1895-6
104° but under 105°	–	–	–	–	–	–	–	–	–	1	1	2	1893-4
	1	1	3	–	–	1	–	1	–	1	1	–	1894-5
	–	–	–	1	–	–	1	–	–	–	–	–	1895-6

Table *showing Months of Greatest Morbidity.*

—	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sep.	Oct.	Total
1893–4	5	6	6	3	1	4	1	8	1	7	10	7	59
1894–5	7	12	7	5	7	7	1	8	5	6	2	2	69
1895–6	1	3	5	8	5	1	5	4	3	2	4	3	44
	13	21	18	16	13	12	7	20	9	15	16	12	

DEATHS.

Name	Admitted	Delivered	Died	—
		1893-1894		
1 M. D.	13 Nov.	15 Nov.	20 Nov.	Uræmia
2 K. C.	20 Dec.	29 Dec.	5 Jan.	Septicæmia; child putrid
3 E. D.	19 Feb.	19 Feb.	24 Feb.	Chronic Bright's disease
4 M. K.	18 Aug.	18 Aug.	19 Aug.	Acute septicæmia
5 K. K.	15 Aug.	16 Aug.	19 Aug.	Hyperemesis
6 E. H.	1 Oct.	Not	6 Oct.	Threatened abortion; septicæmia
7 J. S.	28 Oct.	28 Oct.	30 Oct.	Cæsarean section; perforation of intestine; peritonitis
		1894-1895		
1 A. C.	13 Dec.	11 Dec.	27 Dec.	Incomplete abortion; pyæmia
2 M. H.	18 Dec.	23 Dec.	25 Dec.	Eclampsia
3 E. L.	9 Feb.	Not	9 Feb.	Nephritis
4 C. H.	24 June	1 July	2 July	Bright's disease
5 E. D.	31 Aug.	Not	3 Sept.	Morbus cordis
6 M. B.	11 Oct.	Not	13 Oct.	Bright's disease; uræmia
		1895-1896		
1 M. D.	15 Feb.	17 Feb.	25 Feb.	Induced labour; pyæmia

From the foregoing table it will be seen that of the 14 deaths 7 occurred in the first, 6 in the second, and only 1 in the third year. This is, so far as I know, a record year in the annals of the Lying-in Hospital. Of these deaths 6 were due to septicæmia, 6 to kidney diseases, 1 to hyperemesis, and 1 to morbus cordis.

The six septic cases were as follows:—

Case I.—K. C., aged thirty, admitted 20th Dec., 1893. Labour set in on the 27th, and waters shortly afterwards escaped. The labour was very tedious from uterine inertia. On the 29th her temperature rose to 103·4°. She was then in the second stage, so forceps were applied and a putrid fœtus was extracted. During extraction a quantity of fœtid gas escaped from the uterus. The placenta was adherent, and after the uterus had been douched out with creolin lotion it was removed manually. Next morning her temperature had fallen to 99°, but in the evening it rose to 103·6°. The uterus was again douched out and scraped with Rheinstädter's curette and an iodoform pessary placed in the cavity. She died of septicæmia on the eighth day.

Case II.—M. K., aged twenty-seven, 1-para, admitted 18th Aug., 1894. She had been about twenty hours in labour at her own home, where she was frequently examined and her vagina twice douched out. She had a severe rigor, and her temperature rose to 104°. She was then sent into hospital. On admission her temperature had fallen to 99° but her pulse was 135. She was immediately delivered with forceps and her uterus was douched with creolin. She died at 6 30 in the morning, nine hours after admission. The autopsy revealed nothing abnormal, but the case was evidently one of acute septicæmia.

Case III.—E. H., aged twenty-seven; six months pregnant; had been frequently plugged during the month previous to her admission to hospital, for profuse and recurrent hæmorrhages. Her case has been already fully reported under abortions.

Case IV.—J. S. Reported under Cæsarean Section.

Case V.—A. C., aged twenty-eight, 13-para, four and a half months pregnant. Had had severe hæmorrhage for ten days before admission, and the fœtus, she told us, had escaped five days before. The rest of the ovum was expressed soon after admission, and the

uterus washed out. Six hours later she had a severe rigor, and her temperature rose to 104°. Next day, her temperature continuing high, the uterus was curetted with Rheinstädter's flushing curette and drained with iodoform gauze, but without benefit, and she died on the twentieth day.

Case VI.—M. D., aged twenty-seven, 4-para, admitted 7 Feb., 1895. This patient had been delivered on three previous occasions with great difficulty, owing to pelvic deformity. The pelvis, measured with Skutsche's pelvimeter, showed a true conjugate of 3 inches, and transverse 4¾ inches. Premature labour was induced without any difficulty by Krause's method, but on the following day her temperature rose to 102·4°. She was douched out with creolin lotion. On the 5th day she had a rigor followed by profuse sweating. She was douched again and curetted with Rheinstädter's curette. During the night she became wildly maniacal and died on the 7th day.

The other fatal cases were as follows:—

M. D., aged twenty-four, 2-para, admitted November 13, 1893. Had been seriously ill for three weeks previously with general anasarca. On admission she was semi-conscious, and so helpless that she could not walk, passed urine and fæces under her, and the day after had severe hæmorrhage from the bowels. No vaginal examination was made at any time during her stay in hospital. On November 15 she was delivered naturally of a macerated fœtus. On the third day her temperature suddenly rose to 103°, but sank in twelve hours to normal and did not rise again. She died of uræmia on the 6th day.

E. D., admitted February 19, 1894, 1-para. Had suffered for a long time from chronic Bright's disease. On admission she was hemiplegic and aphasic, and had been so for three months. She had also a violent cough and dulness on percussion, with bronchial breathing over the right lung. Her urine was loaded with albumen. Delivered the same day, by the natural efforts, of a living child. She died on the 5th day.

E. L., admitted February 9, and M. W., admitted Dec. 23, 1894. Have been detailed under eclampsia.

C. H., M. B., and K. K. have been reported under hyperemesis.

E. D., aged thirty-six, admitted August 31, 1895, with aortic valve disease, from which she died on the 3rd of September. She happened to be three months pregnant.

Dr. F. W. Kidd said he was sure that the thanks of the Section were due to Dr. Smyly and his collaborators, Drs. Wilson and Jellett, for the Report. He thought that such results were not likely to be eclipsed for a considerable time. He expressed surprise at the number of cases under the heading of accidental hæmorrhage. In 134 cases of abortion, 50 were curetted, which seemed to be a very large proportion. He congratulated Dr. Smyly on there being no death from placenta prævia. He thought that severe post-partum hæmorrhage, not arising from the situation of the placenta at all, often occurred, and that its origin was often overlooked. He thought that the case in which there was found a double uterus after removal of the uterus, and the subsequent recovery of this patient, was very remarkable.

Dr. Knott asked how Dr. Smyly had prepared the saline solution used for transfusing.

Dr. Tweedy congratulated Dr. Smyly on his results. He observed that a great many of the deaths were in women brought into the hospital with death symptoms already marked. Three of the five septic cases had evidently become septic outside, and nothing could have saved them. The cases of eclampsia seemed to have been very severe. The giving of morphia in eclampsia was an interesting point. Some observers say that its administration kills the child, but in case No. 7 of Dr. Smyly's the child was alive, although the mother got more morphia than any other case. He (Dr. Tweedy) said that morphia could not kill the child, but killed by acting on the respiratory centre. He noticed that laminaria tents had been used in one of the cases of death after abortion. Did thorough plugging of the vagina not dilate the cervix properly in this case?

Dr. Lane congratulated Dr. Smyly on the results of the three years. He could not quite agree with Dr. Kidd in saying that the deaths from accidental hæmorrhage were above the average.

Dr. Glenn added his hearty congratulations to Dr. Smyly on the distinctly great improvement from former years, culminating in the wonderfully low death-rate. In reference to curetting in abortions he regarded that as distinctly an evolution. He thought that the use of the sharp curette in the treatment of abortions was, in skilled hands, quite safe, while for those not so self-confident the use of the blunt instrument was good practice. Dr. Smyly's three fatal cases of incomplete abortion would have died whether curetted or not. He thought that a serious omission in reference

to forceps cases had been made in the Report—viz., there was no record of mortality in regard to the children. He thought that a record of these deaths should also be kept, as it would be of great interest to future generations.

Dr. Doyle considered eclampsia a form of uræmic convulsions. He had not had experience in the treatment of eclampsia with morphia, but had found chloral very useful. He thought that the condition of the kidneys should be found out at the time of the eclampsic convulsions. He concluded by congratulating Dr. Smyly on his results.

Dr. Smyly, in reply, thanked the members for their kindly criticism. In compiling a Report of this kind accuracy was of the first importance, and this he believed was secured by the system employed in the Rotunda. He believed that if the suggestions made by Dr. Glenn were adopted by future reporters they would add to the value of future Reports. He would himself suggest that in addition to noting the total number of cases in which the temperature rose above 100·8°, it would be important to record the number of cases in which the patients were really ill, and those in which it rose on one occasion only. He agreed with Dr. Tweedy that one could not judge of the results of treatment from a small number of cases, and that even large numbers would give an erroneous view, as owing to the rule of the hospital admitting all cases when in labour, a large number were admitted in a condition in which treatment came too late. This was especially evident in the cases of eclampsia and septicæmia. Of the three deaths noted under the former heading, one was in a dying condition when admitted, and he did not believe that the other two could possibly have been saved, certainly not by chloroform.

CLINICAL REPORT OF THE ROTUNDA LYING-IN HOSPITAL, FOR ONE YEAR, NOVEMBER 1, 1896, TO OCTOBER 31, 1897.

By R. DANCER PUREFOY, M.D., Master;
T. Henry Wilson, Henry Jellett, and R. P. R. Lyle,
Assistant Masters.

[Read in the Section of Obstetrics, April 27, 1898.]

During the twelve months comprised in this Report 1,825 women were admitted to the maternity department, 1,448 were confined, 377 were discharged not in labour, and 2 died.

Table No. I.—*Admissions to Maternity Department*, 1896–7.

—	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sep.	Oct.	Total
Total number of Deliveries -	119	120	108	108	86	129	106	118	139	119	113	121	1,386
Abortions - -	6	6	2	4	7	7	3	5	7	5	5	5	62
Total cases treated	...	...	...	...	...	...	...	...	...	...	...	...	1,448
Patients admitted, but discharged not in Labour -	34	29	31	24	40	30	24	32	41	36	25	31	377
Total Admissions	159	155	141	136	133	166	133	155	187	160	143	157	1,825

We have included in this table all who have been admitted to the maternity wards, a number of whom were detained in the hospital for varying periods, and discharged as they were not then in labour.

Table No. II.—*Dispensary for Outdoor Patients.*

Number of First Attendances	Number of Repeated Attendances
4,655	5,585

TABLE No. III.—*Showing Number and Nature of Cases Treated in the Extern Maternity*, 1896–97.

Total number of cases			2,007	Inversion of uterus	1
Abortions			267	Occipito-posterior	22
Curetting for abortion			69	Moles—	
Accidental hæmorrhage			3	Vesicular	1
Placenta prævia			8	Carneous	5
Post-partum hæmorrhage—				Hydrocephalus and spina bifida	2
Atonic			12	Hydramnios	1
Traumatic			3	Mania acuta	2
Adherent placenta			19	Rupture of uterus and decapitation	1
Breech			49	Imperforate anus	2
Footlings			5	Hour-glass contraction	1
Brow			1	Children dead—	
Face			3	Recent	47
Transverse			5	Macerated	11
Shoulder			2	Putrid	3
Twins—				Premature	12
Male	9			Non-viable	31
Female	7				104
Male and Female	3			Mortality—	
			19	Pneumonia	1
Triplets—				Placenta prævia	1
F. F. M. / F. F. M.			2	Inversion of uterus	1
Forceps			37	Pulmonary embolus	1
Prolapse of cord			5	Cardiac disease	1
Version			7		5

ACCOUNT OF DEATHS IN EXTERN MATERNITY.

CASE I.—E. B., aged twenty-six, 3-para. Delivered November 7th, 1896. Normal labour; had normal puerperium till seventh day, when it was found on visiting her that her pulse was 160, and temperature 104·2° F., with foul lochia. She was douched and given strychnin and digitalis, with whisky ʒxii. Under this treatment she improved gradually till November 19th, when acute croupous pneumonia supervened, and she died on November 21st, being the fourteenth day.

CASE II.—M. S., aged thirty-four, 8-para. Delivered July 31st, 1897. Placenta prævia lateralis. When first seen she was collapsed from hæmorrhage, and still bleeding; os two and a half inches in diameter, vertex presentation, membranes unruptured. As the patient was in labour, the membranes were ruptured; the hæmorrhage however continued, and accordingly internal version was performed and a foot brought down; hæmorrhage then ceased. Patient delivered herself of a living

child. As collapse continued a whisky enema was given and also whisky by the mouth; she, however, sank and died half an hour after delivery.

CASE III.—J. S., aged thirty-eight, 4-para. Delivered September 22nd, 1897. Five months' miscarriage. No interference. An aortic systolic murmur was diagnosed at time of confinement. Patient was seen by a student on the tenth day, who reported her quite well; on the twelfth day she suddenly got seriously ill, and sent for dispensary doctor, but died before his arrival.

CASE IV.—M. G., aged forty, 8-para. Delivered September 24th, 1897. Breech presentation—was attended by a student; third stage, 1 hour and 20 minutes. Patient died fifteen hours later; *post-mortem* examination revealed a complete inversion of the uterus.

CASE V.—M. T., aged twenty-two, 1-para. Delivered October 11th, 1897, by forceps on account of prolonged second stage. She was seen two days before delivery, when she had a temperature 103° F., pulse 120, respirations 36, with acute bronchitis and signs of phthisis. Temperature remained high, and on the evening of fifth day she suddenly developed puerperal mania; after administration of ½ grain morphin hypodermically she passed a quiet night. She had a second maniacal attack next day, which, however, soon passed off and did not recur. All her symptoms improved rapidly till the ninth day, when her condition was normal, and continued so until five days later, when, while sitting up in bed, she suddenly fell dead. Pulmonary embolus.

INTERESTING CASES IN EXTERN MATERNITY.

CASE I.—M. M., aged thirty-five, 4-para. Delivered November 6, 1896. Nine hours in labour; triplets—all vertex—two females and one male, all alive; one placenta.

CASE II.—M. D., aged thirty-eight, 8-para. Delivered November 17th, 1896. Four hours in labour; triplets—vertex, breech and vertex—two females and one male, all alive; one placenta, very large; three sacs—the second and third having to be ruptured. Patient received the Queen's Bounty.

CASE III.—M. C., aged thirty-one, 3-para. Delivered November 26th, 1896. Transverse presentation, 7½ months'

pregnancy. There was slight ante-partum hæmorrhage. Right shoulder and hand presented. Patient in strong labour, and in severe pain, the shoulder being fixed at the pubes; the trunk, limbs, shoulders, and head were expelled in succession. Child dead.

Case IV.—M. D., aged thirty, 7-para. Delivered April 6th, 1897. Neglected shoulder presentation, complicated with rupture of uterus. Full time pregnancy. Decapitation. Patient, who was of very intemperate habits, complained of having received a severe kick on the lower part of the abdomen on evening of April 4th; during the following two days she sent on three occasions to the hospital, but not until the third occasion would she allow of any examination whatsoever. She had then been in strong labour for five and a half hours, with severe pain in the hypogastrium; a hand was seen protruding from the vulva, the membranes being intact. The extern maternity assistant, Dr. Lyle, was sent for, and, on arrival (the membranes having in the meantime ruptured) examined the patient under an anæsthetic, and, finding the shoulder well down in the pelvis with the uterus tightly contracted down on the child, refrained from any interference, but sent for Dr. Wilson, the Assistant-Master on duty.

The child was lying in an oblique position, dorso-anterior, with head to right; the left shoulder was firmly fixed in the pelvis, with corresponding hand and forearm protruding at the vulva; all the ribs of left side were easily felt bulging down into vagina. On passing hand into uterus that organ was found ruptured on right side; the greater part of head, however, was held within the uterus by the impaction of the shoulder; the intestines could be felt with the tips of the fingers; the umbilical cord was flaccid and pulseless.

Decapitation was performed with Braun's blunt hook; after which the body of the child was easily delivered by traction on the arm, and the head by pressure on the fundus, with the left hand guiding it, in order to protect maternal soft parts.

The placenta was removed manually.

The rent in the uterine wall was about three inches in length, situated in lower segment to the right and posterior; a thick plug of iodoform gauze was passed through the rent into the peritoneal cavity, for the purpose both of drainage and to keep the intestines out of the wound, the lower end of the gauze

being in the vagina. A hypodermic of ergotinin was given, and the patient, on account of destitution, was removed to the hospital. She made an uninterrupted recovery, the gauze was removed in twenty-four hours; her temperature never exceeded 99·2° F., and she was discharged well on the 22nd of April.

We consider that rupture of the uterus often takes place without any of the alarming symptoms which are recorded in the text-books, and frequently is diagnosed only when the fingers are passed into the uterus to remove the placenta, or with some other object.

The treatment adopted in this case appears to be most satisfactory in cases of uterine rupture uncomplicated by severe hæmorrhage, or the laceration of any other viscus.

TABLE No. IV.

Cases treated in Intern Maternity during the Year 1896-97.

Total number of cases	1,448	Version	8
Primiparæ	519	Perforation and craniotomy	2
Abortions	62	Eclampsia	1
Pelvic presentations	54	Insanity—Mania	4
Shoulder and upper extremities	2	Melancholia	1
Face	3	Phlebitis	1
Brow	1	Rupture of uterus	1
Hydramnios	4	Myxoma chorii	1
Occipito-posterior	27	Intra-uterine fracture of forearm	1
Twins—		Rupture of cervix and vagina	4
Male 6		Laceration of perineum	230
Female 6		Meningocele	2
Male and Female 10		Children died in hospital	39
	22	born dead—	
Prolapse of funis	8	Recent 21	
Placenta prævia	4	Macerated 19	
Accidental hæmorrhage	8	Premature 23	
Post-partum hæmorrhage	12	Putrid 2	
Adherent and retained placentæ (removed manually)	17	Non-viable 13	
			78
Myoma	3	Morbidity	78
Deformed pelvis	4	Mortality—	
Induction of premature labour	3	Rupture of uterus 1	
Forceps	56	Septic endometritis 1	
			2

TABLE No. V.—*Deaths.*

NAME	Admitted	Delivered	Died	Cause of Death
A. M'D.	Dec. 23,'96	Dec. 28	Dec. 31	Rupture of uterus and bladder. Craniotomy.
L. D.	Feb. 8, '97	Feb. 8	Feb. 21	Septic endometritis.

We regret to have to record two deaths, both of which we ascribe to puerperal causes.

CASE I.—For account of death of A. M'D., see under heading Perforation and Craniotomy, page 272.

CASE II.—L. D., aged twenty-eight, 2-para. Admitted, 7th February, 1897. Patient suffering from tertiary syphilis, ulcers on both legs, with extensive sloughing ulceration of labia majora. Scrupulous cleanliness was observed, as far as possible, previous to delivery. No vaginal examinations were made. Delivered next day. Eighteen hours in labour, child stillborn; third stage 35 minutes, placenta and membranes came away entire. The vulva was dusted with iodoform. On the morning of the second day her temperature rose to 101° F. The lochia was slightly fœtid, a vaginal douche was given, but the evening temperature was 102·6° F.; the uterus was douched, but nothing abnormal was noticed. ℞. Quin. sulph. gr. v., every fourth hour. After this the temperature fell for three days. On the sixth morning the temperature rose to 103° F., and pulse to 115, and in the evening to 105° F., pulse 120. The uterus was curetted with Rheinstädter's spoon, but very little came away; the lower part of the vagina was of a greyish colour, covered with a large puerperal ulcer, which was dusted with iodoform. The temperature dropped two degrees for 48 hours, but then rose and fluctuated between 103° F. and 105° F.; the pulse varied from 115 to 146, until the time of her death.

All through the lochia were scanty, except when the uterus was douched, which was done daily. Patient was on from ʒviij. to ʒxx. whisky daily, but it had little or no effect on the pulse-rate. She became exhausted and died on the 13th day.

Post-mortem examination showed the uterus slightly enlarged, and covered by a grey, sloughing membrane, which extended into the vagina. Other organs healthy.

From the *post-mortem* examination of this case we think that, in addition to curetting and douching, it might have been beneficial had the uterus been plugged with iodoform gauze, as recommended by Dührssen.

TABLE No. VI.—*Morbidity.*

Temperature	Nov.	Dec.	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Total
100·8° F. and under 102·2° F.	7	1	8	5	1	3	3	1	9	2	3	9	52
102·2° F. and under 104° F.	2	3	0	3	1	1	1	—	1	3	3	4	22
104° F. and under 105° F.	1	—	—	—	—	—	—	—	—	—	—	—	1
105° F. and over.	—	—	—	1	—	—	—	—	—	—	2	—	3
Total monthly morbidity	10	4	8	9	2	4	4	1	10	5	8	13	78

There were, during the twelve months, 78 cases in which the temperature rose on one or more occasions to 100·8° F. or over. Four of these followed macerated fœtus, 5 were due to puerperal ulcer, 3 to mastitis, 2 to syphilitic sores, 1 to pneumonia, 2 to puerperal mania, and 1 to advanced phthisis. There were only 15 cases in which it was considered necessary to administer a uterine douche; for the remainder an aperient or a simple vaginal douche of creolin proved sufficient.

FACE AND BROW PRESENTATIONS.

All the face presentations terminated naturally. There was one brow presentation in the extern maternity which terminated as a face, on the forehead of which there

was a small caput. There was also one brow presentation in the intern maternity; it was a seven and a half months' pregnancy, and was delivered by forceps on account of delay in the second stage. It was born as a vertex.

TABLE No. VII.—*Application of Forceps.*

I.-para. -	49	V.-para. -	1
II.-para. -	4	VII.-para. -	1
IV.-para. -	1		

SUB-TABLE A.—*Indications for Application.*

Delay in 2nd stage over four hours* - - - -	45
Uterine inertia - - - - - -	1
Prolapse of cord - - - - - -	2
Brow - - - - - - -	1
Twins—uterine inertia, 1st child - - - -	1
Threatened death of fœtus - - - -	4
Acute mania - - - - - -	1
Threatened rupture of uterus - - - -	1

* There were four occipito-posterior positions.

SUB-TABLE B.

Ages of Primiparæ.

17–25 - -	20
26–30 - -	20
31–35 - -	4
36–45 - -	5

SUB-TABLE C.

Result to Child.

Alive -	52
Dead -	4

The percentage application of forceps in the extern maternity was 2·12 per cent., and in the intern 4·04 per cent. This great difference is most probably due to the fact that the proportion of primiparæ to multiparæ is far greater in the intern maternity than in the extern.

Forceps were applied in cases of delay of four hours in the second stage, with material benefit to the mother, and greater safety to the child; and we consider that the results obtained—more particularly as regards the life of the child—amply justify us in not delaying longer.

PERFORATION AND CRANIOTOMY.

Perforation and craniotomy were performed in two cases.

CASE I.—A. M'D., 6-para, admitted December 23rd, 1896. Her first four children were born dead at full term; fifth was a footling presentation, and the head was delivered with extreme difficulty, the child being alive. On 27th December, at 8 o'clock p.m., she came into labour, and at 11 o'clock the os was almost fully dilated, with the head above the brim. She had good pains all night, but her symptoms gave no cause for anxiety till next afternoon, when her pulse began to rise, the temperature remaining normal, and the head still above the brim.

At 3 p.m., she suddenly became very collapsed, her temperature fell, her pulse became rapid and feeble, and it was thought advisable to deliver at once. The fœtal heart could not be heard. Craniotomy was performed, and the child extracted easily. During the evening her pulse became very rapid and intermittent—140 to 150. The lochia were normal in amount. The collapse continued, and she died on December 31st, 1896.

Post-mortem examination showed a considerable amount of hæmorrhage into the abdominal cavity, and a large hæmatoma the size of a cocoa-nut in the left broad ligament. There was a large laceration, several inches in length, running transversely across the fundus of the bladder; and a second circular contused laceration extending from the lower part of the posterior wall of the bladder into the lower uterine segment. This second laceration was most probably caused by the parts becoming nipped between the descending head, and an osseous projection on the posterior aspect of the symphysis. This projection was about the size of a hazel-nut and materially narrowed the true conjugate.

CASE. II.—M. F., aged forty, 8-para. Admitted March 2nd, 1897, from extern maternity in strong labour for many hours previously. The os was three-fifths dilated; head not engaged; abdomen very prominent, and child dead. Craniotomy was performed with Auvard's instrument. Extraction was easy, and convalescence normal.

INDUCTION OF PREMATURE LABOUR.

Premature labour was induced in three cases—twice for contracted pelvis, and once for cardiac disease. In all

three cases Krauze's method, the introduction of bougies, was used. It was successful in two cases, but in the third, that of cardiac disease, the bougies failed to bring on labour, although inserted twice.

Ten laminaria tents were then placed in the cervix, but, as they also failed to bring on labour, bi-polar version was performed, and a leg brought down. The child was born alive, but died in thirty minutes. The other children went out well. In every case convalescence was normal.

TABLE No. VIII.—*Prolapse of Funis.*

Name	Treatment	Result to Child	Presentation	Period of Pregnancy	Remarks
M. B.	Version .	Alive	Vertex	Full time	Asphyxia pallida. Schultzed successfully.
J. K.	Version .	Alive	Vertex	Full time	Os nearly fully dilated. Reposition failed.
A. B.	Forceps .	Alive	Vertex	Full time	Membranes ruptured some time.
E. S.	Forceps .	Alive	Vertex	Full time	Os fully dilated.
B. W.	Left to nature	Alive*	?	6th month	Placenta prævia lateralis.
N. S.	Bi-polar podalic version	Dead	Transverse	6th month	Reposition failed. Os admitted 3 fingers.
T. S.	Left to nature	Dead	?	5th month	—
T. F.	Traction with finger	Alive	Breech	8th month	First of twins

* Died a few minutes after.

ACCIDENTAL HÆMORRHAGE.

There were 8 cases of accidental hæmorrhage admitted. In four of these, as the patient was in strong labour and the first stage well advanced, rupture of the membranes was found to be sufficient treatment. In three cases, however, the hæmorrhage was so severe that the vagina had to be plugged with boiled cotton-wool—after the usual aseptic precautions had been taken—and a tight abdominal binder

with perineal band applied, to check the hæmorrhage and bring on labour.

In every case the mother made an uninterrupted recovery; but in those cases in which plugging had been performed the children were still-born. In these cases the hæmorrhage was so severe that in all probability the placenta had been completely detached. One patient only had a temperature of or above 100·8° F., and this, which she had on admission, fell the second day, and the puerperium continued uneventful.

From our experience of the treatment of accidental hæmorrhage, where the bleeding is severe and labour pains are absent, we are convinced that the firm application of the vaginal plug, combined with the use of a tight and carefully applied abdominal binder, with perineal band, is the only treatment that we can recommend with any confidence.

TABLE No. IX.—*Accidental Hæmorrhage.*

Name	Treatment	Period of Pregnancy	Result to Child	Remarks
M. M'G.	Left to nature	8th month	A.	Was in strong labour; hæmorrhage not severe.
M. C.	Vaginal plug and binder	8th month	D.	Breech presentation.
M. L.	Membranes ruptured	8th month	A.	Hæmorrhage considerable; os ¾ dilated; labour proceeded rapidly after rupture of membranes.
N. E.	Vaginal plug and binder	7th month	D.	High temperature on admission; plug left 4 hours, and on removal child at once expelled by strong pains; good recovery.
M. H.	Membranes ruptured	8th month	A.	Footling; os ¾ dilated; hydramnios; good pains.
M. A. F.	Vaginal plug and binder	9th month	D.	Strong labour in 5 hours; plug removed; child, placenta, and large amount of clot came away.
K. T.	Membranes ruptured	7th month	A.	Os fully dilated on admission.
E. K.	Membranes ruptured	9th month	A.	Admitted in 2nd stage; delivery rapid.

TABLE No. X.—*Post-partum Hæmorrhage.*

Name	Variety	Cause	Treatment	Remarks
A. M'A.	Atonic	Retained placenta	Manual removal	Twins
K. S.	Do.	Adherent placenta	Do.	Uninterrupted recovery
K. G.	Do.	—	Expression of placenta and hypodermic of ergot	Do.
M. S.	Do.	Retained membranes	Manual removal	Temperature rose slightly on 2nd day
L. G.	Do.	Do.	Do.	Uninterrupted recovery
T. Y.	Do.	Retained cotyledon of placenta	Do.	Do.
M. M.	Do.	—	Uterus douched and plugged with iodoform gauze	Do.
C. D.	Do.	Retained membranes	Manual removal	Do.
B. C.	Do.	Protracted labour; forceps	Hot uterine douche	Do.
A. L.	Do.	Retained membranes	Manual removal	Do.
R. B.	Do.	Adherent placenta	Do.	Do.
A. M.	Do.	Twins	Hot vaginal douche and ergot	Do.

TABLE No. XI.—*Placenta Prævia.*

Name	Variety	Result to Child	Presentation	Period of Pregnancy	Treatment and Remarks
K. M'C.	Lateralis	D.	Vertex	8¼ months	Bi-polar version, and foot brought down
L. T.	Marginalis	D.	Vertex	8th month	Do. Do., considerable hæmorrhage into sac
D. D.	Centralis	D.	Vertex	8th month	External version, placenta perforated, and foot brought down
T. D.	Lateralis	D.	Vertex	8th month	Version, and foot brought down, delivered herself in two hours. High temperature, 101° F., evening of 4th day

There were four cases of placenta prævia, in all of which version was performed, and the subsequent delivery left to nature. Two of these cases are included in our table of morbidity.

The patient L. T. showed a temperature of 103° F. immediately after delivery, that was within an hour after version; within twelve hours the temperature was normal, and continued so throughout the puerperium.

The second patient who showed morbidity, T. D., had a rise of temperature to 101° F. on the evening of the fourth day; a vaginal douche was given, and her temperature at once fell, and continued normal until she was discharged well on the tenth day.

ECLAMPSIA.

One case of eclampsia was treated during the year.

CASE.—The patient, M. G., aged eighteen, 1-para, was admitted on October 4th, 1897, when seven months pregnant. Her urine was scanty and highly albuminous, with considerable œdema of the lower extremities. She also complained of temporary loss of vision, and was very irritable and excited. She was given, at 6 50 p.m. on day of admission, gr. ½ morphin hypodermically; as the excitability continued, and as she had had two typical eclamptic seizures, she was given at 10 p.m. same evening gr. ¼ morphin, which was repeated at 10 30 o'clock p.m. As a purgative, mist. sennæ co. was administered shortly after admission, and, as this did not act, croton oil (♏ii.) was given with satisfactory results.

After the last hypodermic of morphin the patient was almost maniacal for several hours. She gradually became quieter, and finally fell asleep, and slept the whole of the next day. After this she rapidly improved, and three days after admission labour set in naturally, and she delivered herself of a living child, weighing 3½ lbs. Her temperature rose to 101° F. on evening of third day after delivery, and was 100·8° F. next evening, but after a uterine douche it fell to normal, and remained so.

During the first twenty-four hours in hospital she only passed ℥xiv. of highly albuminous urine, which increased to ℥xxi. during

the next twenty-four hours, and to ʒlviii. during the next twelve hours, remaining at about ʒl. every twelve hours for three or four days following. It was frequently examined, and during the puerperium the amount of albumen rapidly diminished, there being only a trace of albumen in it the day she was discharged.

Patient and child left the hospital on eighth day after delivery, and were seen at the hospital six weeks later, both perfectly well.

ABORTIONS.

There were 62 cases of abortion admitted during the year. Some of these required no special treatment; only those in which the hæmorrhage was severe, or in which any part of the ovum was still retained, were interfered with. In all these cases the treatment adopted was the emptying of the uterus—if possible by expression of the contents. This failing, and the os being sufficiently dilated, the ovum was removed by the finger, or if the latter condition was not fulfilled, by Rheinstädter's curette.

In one case the cervix was cicatricial owing to a previously performed Schröder's amputation, and as a result there was stenosis of the external os; it was dilated with Hegar's dilators, and a four months' fœtus extracted by means of Schultze's spoon-forceps. The patient's temperature rose on the evening of the sixth day to 104·6°, and after a uterine douche fell to normal and remained so.

In another case the patient was admitted with hæmorrhage, which had been constant for two months previously. The uterus was up to the umbilicus, and she stated that she was three and a half months' pregnant; no fœtal parts could be felt. The os was dilated by means of laminaria tents, a large quantity of clots escaped, and the patient coming into labour was delivered of a four months' fœtus. Convalescence normal.

In another case the patient was admitted in the fourth

month of pregnancy, with a fœtid discharge. The membranes were ruptured, and the fœtus could be felt lying partially in the dilated cervical canal. As the os externum was only the size of a threepenny piece it was divided bilaterally, and the fœtus extracted by Schultze's spoon-forceps. Free hæmorrhage followed its removal; the uterus was curetted and plugged with iodoform gauze. Convalescence normal.

In another case the remains of an incomplete abortion were removed from one horn of a bicornuate uterus.

ICTERUS NEONATORUM.

There were about 20 cases of this affection during the year. They were all of a mild and transient nature, and in every case the jaundice had disappeared before the seventh day.

OPHTHALMIA NEONATORUM.

This was of very rare occurrence, owing, no doubt, to the prophylactic use of 1 per cent. solution of nitrate of silver, instilled, immediately after birth, into the eyes of every child born in the institution.

The most modern form of incubator—the "Couveuse Lion"—has been purchased from the Lion Institute in Paris. It is easily worked and gives perfect satisfaction.

INFANT MORTALITY IN PELVIC PRESENTATIONS.

Of the 54 cases of pelvic presentation in the Intern Maternity, 6 infants were macerated, 15 premature, and 33 full time. Of the premature infants, 7 were alive and 8 dead. Of the full-time infants, 30 were alive and 3 dead, being an infant mortality of 1 in 11, or 9 per cent. We do not count cases under this heading in which version was performed.

Of the 54 cases of pelvic presentation in the Extern

PLATE I.—A case of Hydrencephalocele. The infant lived ten days.

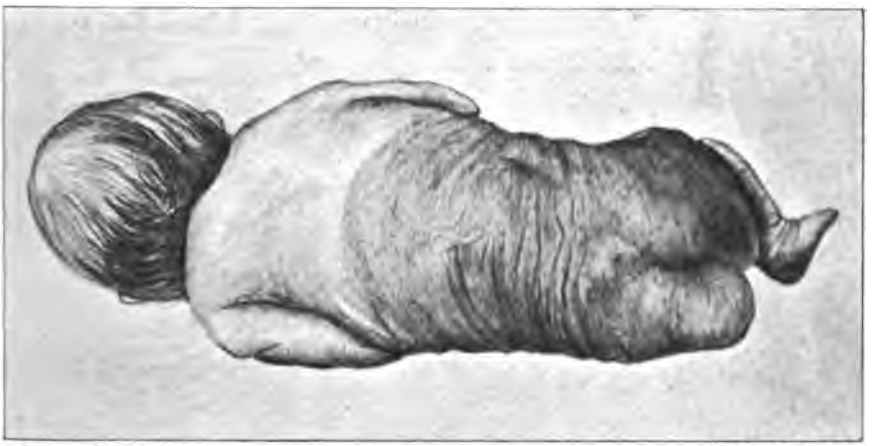

PLATE II.—Pigmentation of the skin of the lower half of the body of an infant. (From a photograph.) There were two similar patches on the scalp.

Maternity, 4 infants were macerated, 2 hydrocephalic, 8 premature, and 40 are recorded without particulars. Of the premature infants, 4 were alive and 4 dead. Of the 40, 28 were alive and 12 dead, being an infant mortality of 30 per cent.

GYNÆCOLOGICAL DEPARTMENT.

The gynæcological department originated in 1835 in a very small way. A few beds in one ward of the old Auxiliary Hospital were set apart "for the humane and beneficial purpose of alleviating the sufferings of patients labouring under diseases peculiar to women."

Since that year the work of this department has steadily increased. In 1877 the whole of the old Auxiliary Hospital was set apart for gynæcology, was thoroughly remodelled, and, so far as possible, brought up to the requirements of the surgery of the day. It was soon found that the nature of this building rendered thoroughly aseptic surgery almost impossible. Additional accommodation for the nursing staff was urgently required, and the hospital would have proved most dangerous in case of fire. Therefore in 1893 the present fine building was commenced, and carried out on the most approved modern scientific principles. The good results of the numerous difficult operations which have been since performed in it are the best proof of the wisdom of erecting it, and of its great value to the suffering poor.

This building, which is called the Thomas Plunket Cairnes Wing of the Rotunda Lying-in Hospital, in commemoration of the great generosity of Mr. Cairnes to the Institution, is set apart principally for gynæcology, and was opened for the reception of patients on November 27th, 1895. It consists of three stories, each of which is connected with the corresponding level of the Lying-in

Hospital by corridors. The ground floor contains the out-patient and dispensing departments, the nurses' sitting-rooms; bedrooms and lavatories for portion of the female staff, and two small wards for special cases. The first floor consists of gynæcological wards, theatres, and patients' lavatories. The appended Plan will explain its arrangement. The second or top floor is entirely set apart for the nurses' bedrooms. (Plate III.)

The gynæcological wards are five in number—two large wards containing sixteen beds each, and three smaller wards containing respectively one, one, and two beds, making a total of thirty-six beds.

There are two sets of lavatories on each floor, their position being shown in the plan. They each contain two w.cs., one bathroom, one room for storage of the patients' clothes, and one room containing three separate sinks—one for the washing of mackintosh bed-sheets and two for soiled vessels.

There are two theatres—one (A) for ventral cœliotomies, and the other (B) for all examinations, vaginal operations, and septic cases. Theatre B calls for no special remarks; Theatre A contains some features which are of interest. It is divided into two unequal parts by a large glass plate; the larger of these contains the wash-basins, sinks, sterilisers, and students' gallery; the smaller is the operating theatre proper, and is connected with the outer and larger part by a glass door. The entire operating part is washed out by means of a hose. It looks towards the north, and has a glass roof, which ensures a good head light. The wash-basins of both theatres are furnished with foot-taps.

The out-patient department consists of three rooms—a waiting room, a consulting room, and an examination room. The latter contains an examination chair and couch, and

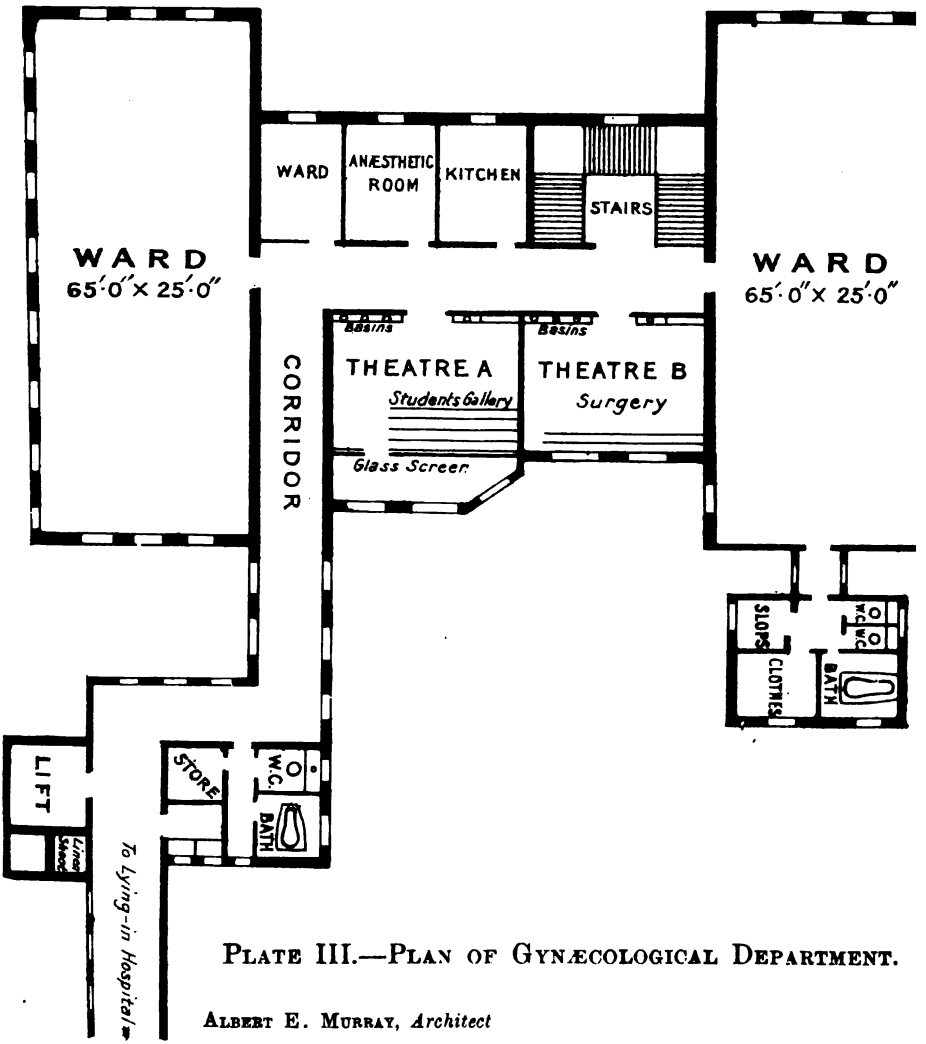

PLATE III.—PLAN OF GYNÆCOLOGICAL DEPARTMENT.

ALBERT E. MURRAY, *Architect*

all the necessary appliances for performing such operations as do not require the admission of the patient to the hospital.

So much for the history and description of the building; we shall now describe briefly the general operative technique:—

Sterilisation.—All towels, operator's coats, dressings, &c., which are intended for use during an operation, are sterilised in a Lautenschlager's steam steriliser. Marine sponges are *not* used, their place being taken by gauze "sponges" formed of eight layers of ordinary butter muslin. These are sterilised in a separate steriliser, from which they are removed, one by one, as they are required during an operation.

All instruments are boiled for twenty minutes in a solution of washing-soda and water. The ligatures used are silk, silkworm-gut, and catgut. The silk is prepared by boiling for thirty minutes, and is stored in 1 in 20 carbolic lotion. Silkworm-gut is prepared by boiling for twenty minutes, and then stored in 1 in 500 corrosive sublimate. The catgut is prepared by a method first introduced at the Rotunda, and which has proved most

Fig. 1.—A, Steriliser; B, Screw Top; C, Rubber Washer.

successful. The gut—chromicised or not, as preferred—is loosely rolled on glass plates and placed in absolute

alcohol for at least two days, fresh alcohol is then substituted for a couple more days to insure absolute dehydration; the plates are then placed in a stout brass box with a screw top (*vide* illustration), which is half filled with alcohol. This box, tightly screwed up, is immersed in a saucepan of cold water, which is gradually raised to boiling-point, and kept boiling for thirty minutes. The box is then removed, and as soon as it is cooled the gut is taken out and stored in a mixture of glycerin 10 parts, and alcohol 90 parts. The chromicised gut is perhaps preferable for vaginal work, non-chromicised for abdominal.

The hands of the operator and his assistants are first cleansed by washing thoroughly with soap, hot water, and a nail-brush for about ten minutes, and are then immersed in corrosive sublimate solution, 1 in 500, for a couple of minutes. All nail-brushes are boiled each morning, and kept lying during the day in strong creolin solution.

Antiseptic solutions.—The antiseptic solutions used are—corrosive sublimate lotion, 1 in 500, for the hands; carbolic lotion, 1 in 20, for storing silk; creolin lotion, 1 in 320, for vaginal and uterine douching; boric lotion, nearly saturated solution for washing out the peritoneal cavity in septic cases; formalin solution, 1 to 3 per cent., occasionally for various purposes.

Preparation of the Patient.—For minor operations on the vagina, the external parts are shaved and thoroughly scrubbed with soap and water; the vagina is douched out with creolin lotion, and well washed out with the fingers and soap. For vaginal cœliotomies the vagina is douched and plugged twice with iodoform gauze the day before the operation; on the day of operation the plugging is removed, and the vagina thoroughly douched, previous to the administration of the anæsthetic.

For ventral cœliotomies, the skin of the abdomen is

washed with soap and water and ether the night before operation, and a compress soaked in corrosive and glycerin, 1 in 100, applied. This is removed when the patient is on the operating table; the skin is again washed with ether, and finally with corrosive sublimate solution, 1 in 500.

For abdominal hysterectomies the two last methods are combined.

The patient is given a purgative thirty-six hours before, and an enema the morning of, operation. She is brought into the operating theatre—which is kept at a temperature of 70° to 75° F.—dressed in a sterilised dressing-gown and long woollen sterilised stockings. No blankets are allowed, as the room is sufficiently heated.

The peritoneal cavity is never drained unless septic matter has escaped into it, or unless there is a large area either denuded of peritoneum or from which there is general oozing. The usual form of drain used in those cases in which it is desired to keep the intestines out of the pelvis is a Mikulicz bag—a gauze bag plugged with strips of the same material. This is removed on the second or third day.

A rubber or glass drainage tube is practically never used, except in cases of general septic peritonitis.

Flushing out the peritoneal cavity is performed only in cases of general septic peritonitis, or in cases in which the patient is greatly collapsed. In the former case boracic solution is used, in the latter "normal saline solution." If septic matter escapes from a ruptured tube, it is preferred to wipe it out rather than douche out the cavity, as the chances of disseminating it are minimised.

In most instances the abdominal wound is sutured with silkworm-gut alone, passing each stitch through from skin to peritoneum. In cases of lengthy incision, or where the abdominal wall is very thin or very fat, the divided peri-

toneum is brought together with a continuous catgut suture.

The wound is dressed in the first instance with ordinary gauze sponges—covered, in turn, with cellulose, absorbent cotton-wool, strapping, and an abdominal binder. At all subsequent dressings double-cyanide and sal-alembroth gauzes are used. If the temperature remains below 100° F. the dressings are not touched for eight days, and then the sutures are removed.

Post-operative Treatment.—After all ventral cœliotomies the patient is placed in a separate ward for the ensuing three or four days, under the care of a special nurse. As a rule nothing is given by the mouth for from 15 to 20 hours; if necessary, nutrient and stimulating enemata are administered every three or four hours. Opiates are strictly avoided, save in very exceptional cases. A purgative is administered on the second morning after operation, and usually consists of calomel, given in small repeated doses, and followed after a few hours by an effervescing saline, and an enema still later if required. Usually the patient is moved into the general ward three days after operation.

After ventral cœliotomies the patient is allowed, as a rule, to sit up on the eighteenth to the twenty-first day, according to the nature of the operation and course of convalescence, and a Lawson Tait's abdominal belt is worn for a year after operation.

Anæsthetics.—The anæsthetics used in the practice of the hospital have been chloroform and ether. Chloroform is invariably used in obstetric work, as it does not give any of the trouble which is so often associated with the administration of ether. In the gynæcological practice of the hospital chloroform is the rule, but occasionally ether is used, especially in those cases where during the administration of chloroform the heart shows any signs of

weakness, or where the respirations become shallow and insufficient. For this purpose Clover's inhaler is used without the bag, and it acts as a valuable stimulant both to the respiratory and circulatory apparatus. Chloroform is administered on a Skinner's mask.

There were 36 patients in hospital on Nov. 1st, 1896; 528 were admitted during the twelve months; 9 died and 31 remained under treatment on 31st October, 1897. Of these patients 468 came under treatment for gynæcological complaints; 60 were discharged, not requiring treatment; 10 were transferred to the Maternity Hospital; 17 were suffering from complaints not of a gynæcological nature.

TABLE I.—DISEASES.

DISEASES	Total Cases	Cured	Improved	Not Improved	Died	REMARKS
VULVA—						
Bartholinian cyst	4	3	–	1	–	
Laceration of labium minus	1	1	–	–	–	Sutured
Hæmatoma	1	1	–	–	–	Absorbed without special treatment
Epithelioma of clitoris	1	1	–	–	–	
PERINÆUM—						
Simple lacerations	43	43	–	–	–	
Complete lacerations	4	3	1	–	–	
RECTUM—						
Carcinoma	3	–	–	3	–	
Hæmorrhoids	4	4	–	–	–	
Recto-vaginal fistula	1	–	1	–	–	Plastic operation; patient 65 years of age; result not very good
Prolapse	1	–	1	–	–	Replaced
Ischio-rectal abscess	1	1	–	–	–	Incised, curetted and plugged with iodoform gauze
URETHRA AND BLADDER—						
Caruncle	6	6	–	–	–	5 excised; 1 cauterised with nitric acid
Vesico-vaginal fistula	1	–	–	1	–	Advanced carcinoma of uterus
Cystitis	5	2	3	–	–	Irrigation with boric lotion
VAGINA—						
Cystocele only	3	3	–	–	–	
Rectocele only	9	8	1	–	–	
Cystocele and rectocele	9	9	–	–	–	
Vaginitis	11	11	–	–	–	
,, senile	3	–	2	1	–	
Cyst of vaginal wall	2	2	–	–	–	
CERVIX—						
Lacerations	32	32	–	–	–	
Hypertrophy	7	7	–	–	–	

TABLE I.—DISEASES—*con.*

DISEASES	Total Cases	Cured	Improved	Not Improved	Died	REMARKS
CERVIX—*con.*						
Erosions	4	4	–	–	–	
Carcinoma	11	1	2	7	1	
Nabothian cyst	1	1	–	–	–	Cyst opened and scraped out
Polypus	6	6	–	–	–	
CORPUS UTERI—						
Endometritis and metritis	96	–	95	–	1	Acute sepsis
Sub-involution	14	14	–	–	–	
Pathological anteflexion	39	–	39	–	–	
Threatened abortion	8	8	–	–	–	
Incomplete abortion	33	33	–	–	–	
Prolapse	7	6	1	–	–	
Procidentia	2	2	–	–	–	
Retroversion and Retroflexion	80	–	80	–	–	
Carcinoma	1	–	–	1	–	Inoperable
Fibro-Myomata	23	9	4	6	4	
Hyper-involution	1	–	–	1	–	
Pregnancy	15	–	–	–	–	
Bicornuate uterus	1	–	–	–	–	
FALLOPIAN TUBES—						
Sacto-salpinx	2	–	–	2	–	Refused operation
Salpingitis	5	2	1	2	–	
Tubal pregnancy	4	4	–	–	–	
Pyosalpinx	8	5	–	3	–	Three refused operation and were discharged
Hæmatosalpinx	5	5	–	–	–	
Adenoma	2	2	–	–	–	
Tubercular	2	2	–	–	–	
Hydrosalpinx	1	1	–	–	..	

TABLE I.—DISEASES—*con.*

DISEASES	Total Cases	Cured	Improved	Not Improved	Died	REMARKS
OVARIES—						
Cyst	25	19	–	5	1	Four refused treatment; one was an exploratory cœliotomy described later on
Dermoid	2	2	–	–	–	
Cirrhosis	1	1	–	–	–	
Parovarian cyst	1	1	–	–	–	
Prolapse	7	–	–	7	–	
PELVIC PERITONEUM AND CELLULAR TISSUE—						
Cellulitis and Parametritis	3	–	3	–	–	
Hæmatocele	9	–	4	5	–	
Peritonitis	2	–	1	–	1	
Abscess	1	–	–	1	–	Pelvic abscess opening into rectum
ABDOMEN—						
Carcinoma	3	–	1	2	–	General
Ventral Hernia	4	3	–	1	–	One refused operation.
Umbilical epiplocele	1	1	–	–	–	
Abscess	3	1	1	–	1	
Splenic leucocythæmia	1	–	1	–	–	
MISCELLANEOUS—						
Coccygodynia	1	–	1	–	–	
Calculus in ureter (?)	1	–	1	–	–	
Mammary scirrhus	1	–	1	–	–	Excised
Incontinence of urine	3	1	2	–	–	
Bubo	1	1	–	–	–	
Mammary abscess	1	1	–	–	–	
Phlebitis	1	1	–	–	–	

VULVA.

Bartholinian Abscess.—Of this there were several cases, all of which were opened, curetted, and plugged with iodoform gauze in the dispensary, the patients not being detained in hospital.

Bartholinian Cysts.—In three cases the cyst was of a simple nature; it was opened, the cyst wall dissected out, and the cavity stitched up with continuous catgut suture. The fourth patient refused treatment.

Epithelioma of the Clitoris.—This patient was about three months pregnant; the tumour was the size of a hazel-nut, with an ulcerating surface; it was dissected out from the vestibule, and proved on microscopic examination to be epitheliomatous. Patient was delivered at full term in the maternity wards on Sept. 24th, 1897, of a living child, and there was no appearance of a recurrence.

PERINÆUM.

Simple Laceration.—Of the 43 cases of simple uncomplicated laceration of the perinæum that is not associated with rectocele, 37 were treated by Lawson Tait's operation; these, with one exception, were stitched with silkworm-gut, which was removed on the eighth day; in the remaining case catgut was used; it was absorbed and union was perfect. Six cases were operated on by Sänger's method. In every case there was a preliminary curetting of the uterus. The patients were allowed up on the twelfth day.

Complete Laceration.—In every case Lawson Tait's method was adopted; in two of these there was incontinence of fæces, one of which had, in addition, ulceration of the posterior rectal wall, the laceration extending one and a half inches up the recto-vaginal septum. This patient underwent a preliminary treatment until the ulcers were healed. Following Lawson Tait's recommendation,

and contrary to the usual procedure of the hospital—that is, not giving an aperient until the evening of third day—the bowels were opened on the succeeding day by an enema: some of the stitches unfortunately gave way, and although the patient left hospital with control over her rectum and in every way relieved, she had not a perfect perinæum. These cases are allowed to sit up on the twelfth day and leave their bed two days later. (Plate IV.)

RECTUM.

Carcinoma.—Two cases were inoperable and were discharged, the third was sent to a general hospital.

Hæmorrhoids.—Four patients sought admission for complaints of a gynæcological nature, and, in addition to other treatment, the hæmorrhoids were excised.

VAGINA.

Vaginitis.—Of these cases eleven occurred in young women and were treated by several applications of various astringents, especially pyroligneous acid; one was caused by an incarcerated hollow vulcanite ring pessary, which had to be broken up with bone forceps before it could be removed. There were three cases of senile vaginitis, which were treated in a similar manner, and a considerable number of patients were found suffering from vaginitis in association with other gynæcological complaints, which we have not thought necessary to tabulate.

Cyst of Vaginal Wall.—One of these was a simple cyst, which was dissected out; the other was loculated and contained pus. It was freely opened, curetted, and plugged with iodoform gauze.

Cystocele.—There were three cases of cystocele, unaccompanied by any marked degree of prolapse of the posterior vaginal wall; in all of these the usual operation—that of removing an oval flap from the anterior vaginal

PLATE IV.—This patient (who came from the country) had a complete Laceration of the Perinæum, consequent on a forceps delivery on her first confinement eighteen months previously. She had been stitched, but the skin alone had united, leaving a large recto-vaginal fistula behind it.

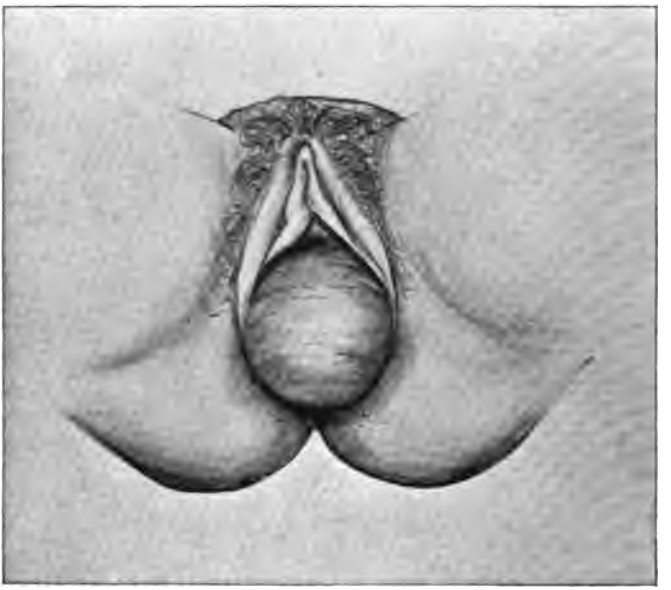

PLATE V.—A case of Cystocele.

wall—was performed, the exposed surface being stitched up with a continuous catgut suture, which was left to be absorbed. In two of these perinæorrhaphies were performed, which are recorded under that heading. There was a rise of temperature to 103° F. on the evening of the second day in one of these cases, without any corresponding rise of pulse; the temperature, however, fell to normal next day and continued so. (Plate V.)

Rectocele.—When this condition occurred, it was found in every case to be due to an old perineal laceration. It was repaired by the methods recommended by Hegar or Martin, the former being preferred. The perineal stitches, which were of silkworm-gut, were removed on the eighth day. The results were extremely satisfactory except in one case.

Cystocele and rectocele, when found combined, were treated as described under the two headings. In all plastic operations on the vagina there is a preliminary curetting of the uterus. After vaginal operations iodoform gauze is placed loosely in the vagina and removed the same evening. Patients are allowed to sit up on the sixteenth to the eighteenth day, and to get up on the twenty-first. Cystocele and rectocele associated with prolapse or procidentia are included under the latter headings.

CERVIX.

Lacerations.—Those requiring operation were mostly bilateral, and often associated with hypertrophy and [or] erosion, occasionally of the follicular variety. In cases complicated with erosion or hypertrophy, Schröder's amputation was performed. This was done eighteen times.

In cases of deep laceration, where there was no hypertrophy of the cervix, Emmet's trachelorrhaphy was the one preferred. This operation was performed eight times.

Sänger's trachelorrhaphy was performed five times.

In one case the last operation was done on the left side of the cervix and an Emmet on the right.

In two others the laceration with erosion was so slight that it was sufficient in one case to puncture the follicles. and in the other to touch the surface with nitric acid.

In another case in which Sänger's trachelorrhaphy had been performed unsuccessfully some months previously the laceration was very deep, and the erosion extended right up into the left lateral fornix, the chief features being menorrhagia and profuse leucorrhœa. It was treated for three weeks with applications of carbolic acid without marked improvement. An Emmet's operation was performed; but seven days later the stitches gave way, causing severe hæmorrhage; the stitches were re-introduced; the patient made a good recovery, union being perfect.

In every case of operation on the cervix a small strip of iodoform gauze is passed into the cervix and the vagina is loosely packed with the same.

In most cases silkworm-gut sutures are used, occasionally catgut, and the former are removed on the twenty-first day. The patient is not allowed to sit up in bed until the twelfth day, is allowed up on the sixteenth, and leaves the hospital the day after the removal of the stitches. During this period vaginal douches are administered only in exceptional cases. An aperient is usually given on the evening of the second day. The results from this treatment have been remarkably good.

Hypertrophy unassociated with laceration was found in nulliparous women in five cases, in four of which Schröder's amputation was performed; in the other, the cervix was so elongated, with stenosis of the internal os and severe dysmenorrhœa, that a posterior division was considered necessary in addition to circular amputation.

In one case, occurring in a 1-parous woman, there was a hypertrophic growth on the posterior lip of the cervix, which filled up the posterior fornix. This was amputated, and on microscopic examination proved to be benign. In another case the patient had been only once pregnant, and had miscarried at six months; the cervix was hypertrophied and elongated, with no evidence of laceration. Amputation by Schröder's method was performed.

Erosions occurring in nulliparæ, which were unassociated with marked hypertrophy of the cervix are recorded in only four cases. In two of these the erosion was excised by Schröder's method; one was cauterised with nitric acid, the other was curetted.

We might remark here that in every case of operation on the cervix a preliminary curetting of the uterus was done.

Malignant Disease.—It is unfortunate that patients suffering from this terrible disease seldom seek advice sufficiently early to admit of radical treatment; and often the disease is so far advanced that any but palliative treatment is contra-indicated. Of the eleven cases admitted during the year nine were of this nature, in two of which the palliative treatment recommended by Marion Sims—that of curetting followed by application of strong caustics—was adopted, with temporary benefit; in the other two, where radical treatment was attempted, vaginal hysterectomies were performed. One of these unfortunately died; the case will be described later.

Polypus.—This usually occurred in nulliparous women, and was of the mucous variety. In one case there was a myoma growing in the fundus of the uterus; another was interesting from the fact that nine months after the removal of the polypus the patient returned with a large fibrous polypus, filling up and distending the cervical canal, and, in addition, a small myoma in the body of the uterus.

UTERUS.

Pathological Anteflexion or [and] Stenosis of the Uterine Canal—

(*a*) Occurring in married women whose chief symptoms were sterility or [and] dysmenorrhœa. Twenty-three cases are recorded under this heading, in fourteen of which Dudley's modification of Marion Sims' operation—that of posterior division of the cervix—was performed, the uterus being at the same time curetted; in six cases the cervical canal was simply dilated and the uterus curetted, and in one case dilatation of the cervix was considered sufficient. In two of these cases iodised-phenol was injected after curetting on account of concomitant endometritis.

Two other cases were admitted suffering from vaginitis, which alone was treated.

(*b*) Occurring in unmarried women whose chief symptom was dysmenorrhœa. Fifteen cases presented themselves, in ten of which posterior division of the cervix was performed, and in four the cervical canal was dilated and the uterus curetted. In one of the latter cases iodised-phenol was injected into the uterus after curetting for a similar reason to that above stated.

One case which had been dilated and curetted on a previous occasion without any apparent benefit, and in which the left ovary was prolapsed into Douglas's space, was treated with glycerin and ichthyol tampons.

There was one case of pathological anteflexion which was associated with repeated abortions at less than three months. Patient had been married eighteen months, during which period she had aborted three times; she was simply curetted.

Pregnancy.—Eight cases of hæmorrhage were admitted, in which it was found that the patients were pregnant for periods varying from three to six months. In four of these the hæmorrhage was so excessive that it was considered

necessary to empty the uterus. Laminaria tents were placed in the cervix and the vagina was tamponed to bring on labour. In one the cervix was dilated and a large quantity of treacle-like matter, together with a dead ovum, was removed with a Rheinstädter's curette. In another case the hæmorrhage ceased shortly after admission and did not recur. Two were transferred to the maternity wards. Thirty-three cases of incomplete abortion were admitted; a large number of these were recent, and were curetted with Rheinstädter's curette, but several of them were of considerable standing, in which the sharp curette was used. In six cases the hæmorrhage after curetting was so severe that it was necessary to plug the uterus with iodoform gauze. A temperature occurred in two cases, but after the administration of a uterine douche it fell to normal and continued so; in both these cases there was retroversion of the uterus.

Prolapse.—Cases of prolapse were usually associated with cystocele and rectocele and were treated accordingly. In one case, where the patient was seventy-four years of age, a pessary was considered sufficient. In another case vaginal hysteropexy was performed in addition, and is recorded under that heading.

Procidentia.—In one case the treatment was similar to above, with vaginal hysteropexy; in the other, in addition to vaginal operations, the cervix was amputated by Schröder's method on account of considerable hypertrophy.

Endometritis.—This complaint was often associated with other gynæcological complaints, especially metritis. The treatment adopted in forty-seven cases was curetting alone; in cases where the endometrium was very abundant, iodised-phenol was injected with a Braun's syringe immediately after the curetting, and in some instances was repeated seven days later; in two instances perchloride of iron took the place of the iodised-phenol. We very much regret to have to record

a death under this heading, details of which will be found later on.

Subinvolution.—As all the ordinary text-books omit to mention the symptoms of this condition in the early stage, it will not, we think, be out of place to do so. They are:—Post-partum intermittent hæmorrhages, or a red discharge continuing after confinement for varying periods exceeding one week, associated with a bearing-down or dragging feel in the pelvis, with an undue enlargement of the uterus, which is usually tender on palpation. The treatment consisted in curetting the cavity of the uterus, the injection of iodised-phenol, together with the administration of ergot and iron.

Retroversion and Retroflexion.—These cases were treated by curetting and the introduction of a pessary. The pessaries selected were those of Smith-Hodge and Thomas, the latter being used in cases of hypertrophy or elongation of the cervix. In those displacements which were caused by adhesions of a recent nature, Schultze's method was adopted to break them down. Where the adhesions were too firm to break down, the treatment adopted was rest in bed, with the use of ichthyol and glycerin tampons and hot douching.

Fibro-Myomata.—Six of these cases refused operation and were discharged, one of which had been transferred from the maternity side, the myoma being of considerable size. Two of them were curetted, as the myomata were of small size and symptoms trifling. Of the others—all of which will be detailed under their special operations—eight were removed by panhysterectomy, two by myomectomy, two by morcellation, in two ovariotomy was performed, and in one case salpingo-oöphorectomy.

Bicornuate Uterus.—An interesting case of this description came under treatment for dysmenorrhœa and menorrhagia.

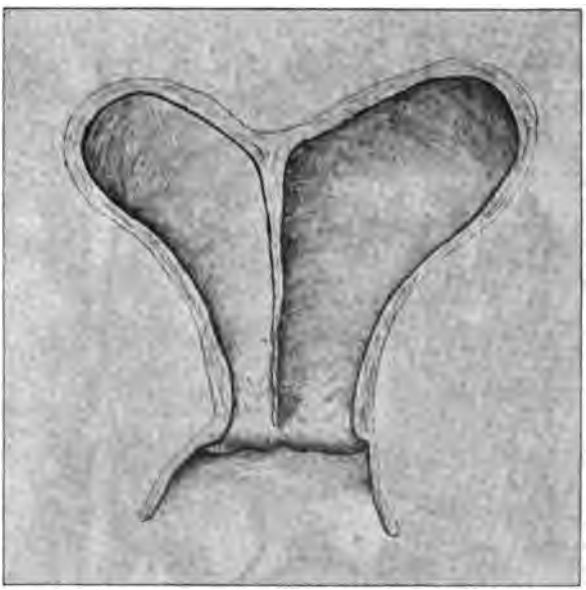

PLATE VI. (Diagrammatic).—Bicornuate Uterus, septum persisting.

In addition to the bicornuate condition the septum persisted to the os externum, the sound passing up at either side of it into the corresponding cornu. There was, in addition, a multilocular cyst in the anterior vaginal wall, which has been recorded under that heading. (Plate VI.)

TABLE II.—SPECIAL OPERATIONS.

Perineorrhaphy—		
Lawson Tait's	37	
Sänger's	6	
Lawson Tait's (for complete rupture)	4	
		47
Anterior colporrhaphy		17
Colpo-perineorrhaphy—		
Hegar's	22	
Martin's	3	
		25
Trachelorrhaphy—		
Emmet's	8	
Sänger's	5	
		13
Amputation of cervix—		
Schröder's	25	
Circular	1	
		26
Excision of benign growth from cervix		1
Schultze's treatment of adherent retroversion		4
Posterior division of the cervix		25
Marion Sims' operation for cervical carcinoma		2
Plastic operation for recto-vaginal fistula		1
Vaginal cœliotomy—		
Hysteropexy	2	
Hysterectomy	2	
,, (by morcellement)	2	
Ovariotomy	2	
Exploratory	3	
		11

Ventral cœliotomy—	
Panhysterectomy - -	- 9
Ovariotomy - -	- 14
Salpingo-öophorectomy -	- 21
Miscellaneous - -	- 7
Exploratory - -	- 4
	—— 55

Posterior Division of Cervix (or Marion Sims' operation) was performed, according to Dudley's modification, twenty-five times—once for cervical elongation in a nulliparous woman; fourteen times for pathological anteflexion, or [and] stenosis of the uterine canal, occurring in married women whose chief symptoms were sterility or [and] dysmenorrhœa; and ten times in unmarried women, with a similar condition, but whose chief symptom was dysmenorrhœa.

Schröder's Amputation of the Cervix was performed twenty-five times—eighteen times for laceration, associated with hypertrophy, or [and] erosion; five times for hypertrophy, unassociated with laceration; and twice for erosions occurring in unmarried women.

VAGINAL CŒLIOTOMIES.

Case 11.—Owing to extensive ulceration of the cervix the actual cautery was freely used before the operation was commenced. The body of the uterus was small, and there was no difficulty in removing it. There was some thickening in the broad ligaments, and clamps were used; the clamps were removed on the third day. She died on the seventh day, when the temperature ran up to 104° F., with almost total suppression of urine. Pain continued all along, and on the day before death there was some foul-smelling discharge from vagina. *Post-mortem* showed some sloughing where the clamps had been applied, which extended to the pelvic peritoneum; the kidneys were granular and contracted, and were probably the primary cause of death. As the latter did not occur during the clinical year, it is not included in the list of deaths.

TABLE III.—VAGINAL CŒLIOTOMIES.

No.	Name	Age	Disease	Operation	Result	REMARKS
1	M. M.	36, M.	Prolapsus uteri	Mackenrodt's vaginal fixation	Cured	—
2	S. A.	49, M.	Multinodular myoma	Doyen's morcellement	Cured	—
3	K. W.	47. M.	Procidentia uteri	Mackenrodt's vaginal fixation	Cured	—
4	M. M.	38, M.	Intra-cervical carcinoma and myoma	Hysterectomy	Cured	Seen twelve months later. She says she never enjoyed better health.
5	E. H.	41, S.	Ovarian cirrhosis	Double ovariotomy	Cured	Operation difficult on account of short ligament and narrow vagina.
6	L. G.	26, M.	Hydrosalpinx	Exploratory	—	See Table VI., Case 17.
7	J. C.	34, M.	Myoma	Doyen's morcellement	Cured	—
8	J. N.	40, W.	Tubercular disease of peritoneum	Exploratory	Relieved	Caseous nodule removed and found tubercular.
9	K. W.	27, M.	Dermoid cyst	Left ovariotomy	Cured	Cyst contained a quantity of hair.
10	L. D.	28, M.	Ovarian cyst	Exploratory	Relieved	Cyst too adherent to be removed. Patient examined twelve days later; cyst had disappeared.
11	M. M'C.	48, M.	Cervical carcinoma	Hysterectomy	Died	*Vide supra.*

TABLE IV.—PANHYSTERECTOMIES.

No.	Name	Age	Disease	Result	REMARKS
1	M. M'C.	40, M.	Large cystic myoma	Died	Tumour weighed 16 lbs. *Vide infra*, under "Deaths."
2	E. M.	37, M.	Large myoma	Cured	Size of 6½ months' pregnancy. Confined six months previously.
3	S. M'N.	30, M.	Large myoma	Cured	Size of 7 months' pregnancy.
4	R. H.	33, S.	Fibro-cystic myoma	Cured	Size of 6 months' pregnancy.
5	K. M.	40, M.	Myoma	Cured	Size of 4½ months' pregnant uterus.
6	M. N.	46, M.	Myoma	Died	Size of large fœtal head. *Vide infra*, under "Deaths."
7	R. L.	50, M.	Large myoma	Died	Extended to ensiform cartilage. *Vide infra*, under "Deaths."
8	M. P.	36, M.	Myoma	Cured	Extended to umbilicus.
9	W. B.	32, S.	Large myoma	Cured	Weighed 12½ lbs.; capsule very vascular.

TABLE V.—OVARIOTOMIES.

No.	Name	Age	Disease	Operation	Result	REMARKS
1	M. D.	29, M.	Dermoid of both ovaries	Double	Cured	Each size of Tangerine orange.
2	B. D.	37, M.	Multilocular ovarian cyst	Left	Cured	Size of seven months' pregnancy.
3	M. R.	48, M.	Ovarian cyst .	Left	Cured	Size of seven months' pregnancy.
4	M. C.	22, S.	Ovarian cyst .	Right	Cured	Extending to umbilicus.
5	E. M.	28, M.	Ovarian cyst .	Right	Cured	Size of an orange; adherent to intestines by firm adhesions, which required division with the scissors; peritoneal coat of intestine stitched in several places; convalescence normal.
6	A. C.	26 M.	Ovarian cyst .	Left	Cured	Size of fœtal head.
7	M. A. J.	60, W.	Ovarian cyst .	Right	Cured	Size of seven months' pregnancy; cyst thick-walled, containing thick mucoid fluid.
8	M. G.	50, S.	Multiple myomata .	Right	Cured	Left ovary atrophied.
9	M. M'D.	54, S.	Multilocular ovarian cyst	Right	Died	Size of full-term pregnancy. *Vide infra*, under "Deaths."
10	M. M.	50, W.	Glandular ovarian tumour	Right	Cured	Size of seven months' pregnancy.
11	S. S.	50, S.	Fibro-myoma of ovary	Right	Cured	Size and shape of a large saucer, two inches thick; pedicle, narrow band 6 inches long; myomectomy in addition; calcified myoma size of hen's egg.
12	E. M.	36, M.	Ovarian cyst .	Left	Cured	Size of tennis ball.
13	A. B.	19, S.	Ovarian cyst .	Right	Cured	Cyst size of 4½ months' pregnancy; tapped before removal.
14	A. S.	33, M.	Ovarian cyst .	Right	Cured	Simulated pregnancy. *Vide infra.*

OVARIOTOMIES.

CASE 14.—Tumour was the size of a full-time pregnancy; was separate from the uterus; partly cystic and partly solid; the solid part resembled a fœtal head felt through liquor amnii. The cyst contained a large quantity of dirty black fluid; there was no trouble removing it. (See Plate VII.)

SALPINGO-ÖOPHORECTOMIES.

CASE 2.—The stitches were removed on the eighth day. During the night she had a severe fit of coughing, and when seen in the morning the wound was found opened, the intestines having escaped under the dressings. She was anæsthetised and the dressings were removed, when it was found that about three feet of the intestine was protruding and was adherent to both skin and dressings. The adhesions were separated, the protruding intestine thoroughly cleansed with boric lotion, the abdomen irrigated with same lotion, the edges of the wound vivified and resutured. The patient made an uninterrupted recovery.

CASE 4.—This is a rare condition; the pedicle was twisted three times on itself, as shown in illustration. (See Plate VIII.)

CASE 15.—It was first attempted to remove this tumour by vaginal cœliotomy, but on account of dense adhesions the operation was abandoned, and eleven days later ventral cœliotomy was performed. The tumour, together with right tube and ovary, was removed, and proved to be a hydrosalpinx about the size of a kidney. Convalescence normal.

CASE 16.—During the breaking down of adhesions which bound a tumour—probably a dilated tube, in Douglas's pouch—some pus escaped into the pelvic cavity; the mesentery was also adherent in this region. The tumour was removed with difficulty along with an ovarian cyst, size of an orange, and a parovarian cyst (?) was shelled out from the posterior aspect of the right broad ligament. The pelvis was wiped out, Mikulicz bag inserted, and abdomen closed. After the removal of the bag pus continued to come from the pelvic cavity for a considerable time and it was found necessary to introduce a glass drainage-tube to prevent the wound closing on the surface. This probably caused the development of a fæcal fistula which occurred a fortnight after the operation. This had

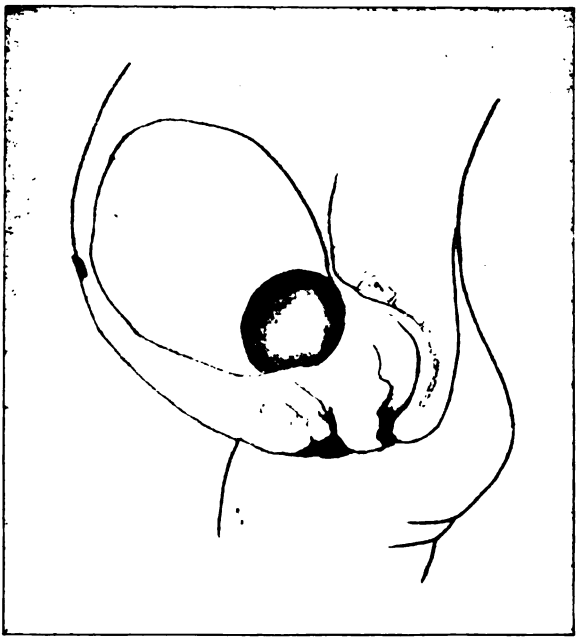

PLATE VII. (Diagrammatic).—Ovarian Fibro-cystic Tumour simulating Pregnancy.

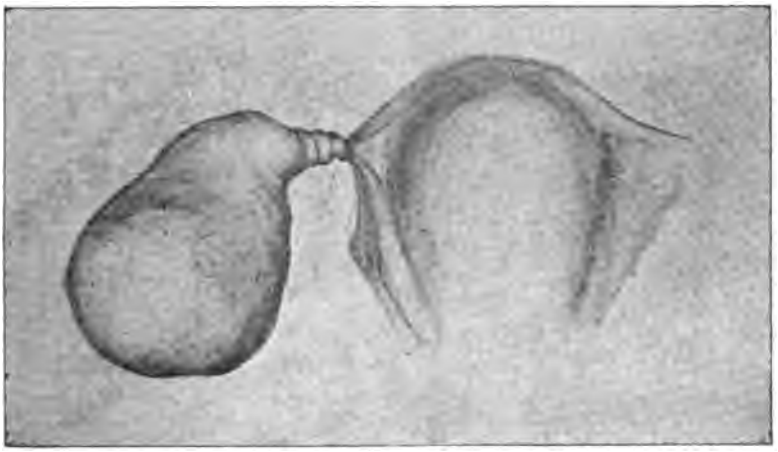

PLATE VIII.—Pyosalpinx with twisted pedicle.

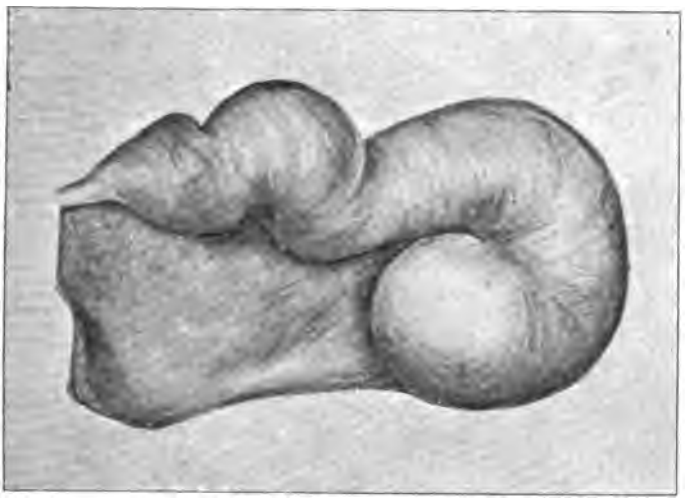

PLATE IX.—A case of Pyosalpinx.

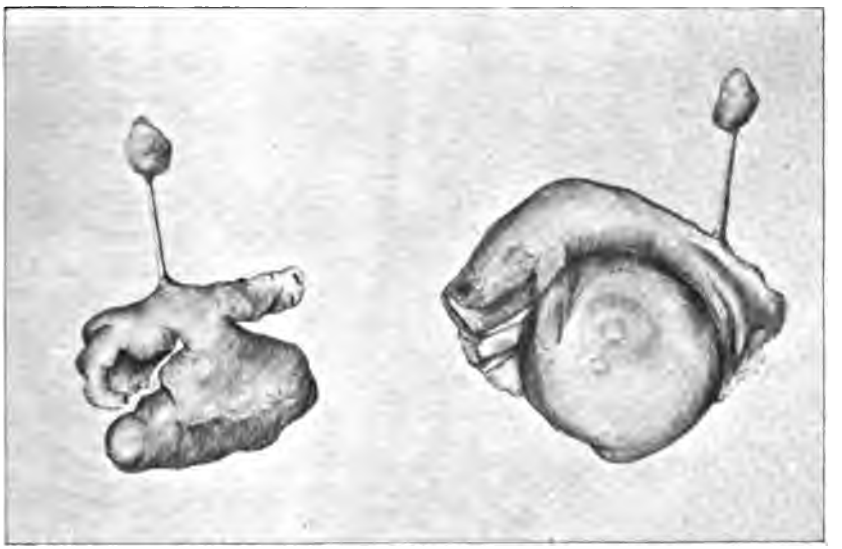

PLATE X.—A case of Double Pyosalpinx with Hydatids of Morgagni.

TABLE VI.—SALPINGO-OOPHORECTOMIES.

No.	Name	Age	Disease	Operation	Result	REMARKS
1	H. C.	47 S.	Benign adenoma	Left	Cured	
2	T. M'K.	32 M.	Double hæmatosalpinx	Double	Cured	*Vide supra.*
3	B. E.	25 M.	Right hæmatosalpinx	Double	Cured	Right tube adherent in Douglas's pouch, ruptured on manipulation, with escape of two large blood clots; left tube diseased; abdomen irrigated.
4	M. B.	18 M.	Pyosalpinx	Left	Cured	Twisted pedicle. *Vide supra.*
5	E. M.	28 M.	Dilated tube and cystic ovary	Left	Cured	Left parotitis on fourth day. Suppuration in parotid gland on tenth day, which detained her in the hospital till the fifth week.
6	M. J. C.	40 M.	Ovarian cyst and hæmatosalpinx	Right	Cured	Cyst size of five-months' pregnancy, with a twisted pedicle.
7	M. A. O'B.	37 M.	Tubercular ovary and tube	Right	Cured	Was detained in hospital for a considerable time owing to purulent discharge from abdominal wound; twelve months later patient in good health.
8	E. W.	36 S.	Multiple myomata	Double	Died	*Vide infra*, under "Deaths."
9	R. G.	26 M.	Ruptured hæmatosalpinx	Right	Cured	Abdomen irrigated. Patient markedly jaundiced on third day, which lasted two days.
10	N. W.	20 M.	Right hæmatosalpinx Left pyosalpinx	Double	Cured	Small sinus in abdominal wound. Four months afterwards a piece of silk came away, and sinus persisted for more

11	M. R.	28 M.	Ruptured tubal pregnancy	Left	Cured	Tumour filled the whole of Douglas's space, and had ruptured.
12	F. C.	28 M.	Adenoma of both tubes	Double	Cured	
13	M. K.	30 M.	Double pyosalpinx	Double	Cured	Left tube matted in Douglas's pouch, with a piece of omentum and a coil of intestine. In separating adhesions intestine was injured, and was stitched.
14	A. M'G.	40 M.	Double pyosalpinx and ovarian cyst	Double	Cured	Cyst of considerable size filling lower part of abdomen. Some pus had escaped from the tubes into the pelvis.
15	L. G.	26 M.	Hydrosalpinx	Right	Cured	*Vide supra.*
16	M. L.	27 M.	Double pyosalpinx, Ovarian cyst, Parovarian cyst	Double	Cured	*Vide supra.*
17	K. R.	26 M.	Cystic ovaries and enlarged tubes	Double	Cured	Left ovary size of a large egg, and attached to the uterus by vascular adhesions which gave considerable trouble during operation.
18	A. F.	34 M.	Left tubal pregnancy	Left	Cured	Concomitant uterine pregnancy. *Vide supra.*
19	M. A. B.	30 M.	Ruptured tubal pregnancy	Right	Cured	*Vide supra.*
20	J. W.	34 M.	Ruptured tubal pregnancy and cystic ovary	Right	Cured	*Vide supra.*
21	H. T.	30 M.	Enlarged tubes and ovaries	Right	Relieved	Uterus myomatous—appendages very firmly adherent posteriorly.

TABLE VII.—MISCELLANEOUS.

No.	Name	Age	Disease or Condition	Result	REMARKS
1	A. M.	56, M.	Ventral hernia . .	Cured .	Following cœliotomy four years previously.
2	M. S.	34, M.	Ventral hernia . .	Cured .	Following cœliotomy three years previously.
3	A. T.	27. M.	Umbilical epiplocele .	Cured .	Following confinement five years previously. Surface had commenced to ulcerate.
4	I. B.	39, M.	Ventral hernia . .	Cured .	Following cœliotomy six years previously. Three confinements in the meantime.
5	L. C.	26, M.	Large abdominal abscess	Died .	*Vide infra*, under "Deaths."
6	C. M.	49, M.	Myoma . . .	Cured .	Size of six months' pregnancy. Myomectomy.
7	M. B.	30, S.	Multiple myomata .	Cured .	Two pedunculated myomata, size of oranges, ligatured and removed. Abscess in left broad ligament burst during removal. Convalescence normal. Great hypertrophy of cervix, which protruded from the vulva, amputated five weeks subsequently.

TABLE VIII.—EXPLORATORY.

No.	Name	Age	Disease	REMARKS.
1	M. P.	22, M.	Acute general peritonitis . .	Abdomen opened and irrigated. Patient died same night. *Vide infra*, under "Deaths."
2	B. G.	55, M.	Malignant tumour (?) . .	Tumour extended from the pelvis to three inches above the umbilicus, and was universally adherent. No attempt at removal.
3	E. O'H.	20, M.	Adherent retroversion, causing severe pelvic pain	Fundus bound to rectum by old, firm adhesions. In breaking these down there was free hæmorrhage, controlled by continuous suture. Appendages normal.
4	C. B.	50, M.	Calculus in ureter (?) . .	Removal failed. *Vide infra.*

TABLE IX.—DEATHS.

No.	Name	Age	Disease	Operation	Cause of Death
1	B. F.	56, M.	Multiple myomata . .	Panhysterectomy . .	Bronchitis.
2	M. M'C.	40, M.	Large cystic myoma . .	Panhysterectomy . .	Shock.
3	M. F.	32, M.	Endometritis . . .	Curetted; iodine injected .	Acute sepsis.
4	E. W.	36, S.	Multiple myomata . .	Double salpingo-öophorectomy	Intestinal obstruction.
5	M. P.	22, M.	Acute general peritonitis .	Abdominal cavity opened and washed out	Septic peritonitis.
6	M. M'D.	54, S.	Multilocular ovarian tumour .	Ovariotomy . . .	Septic pneumonia.
7	M. N.	56, M.	Myoma uteri . . .	Panhysterectomy . .	Intestinal paralysis.
8	R. L.	50, M.	Myoma uteri . . .	Panhysterectomy . .	Shock.
9	L. C.	26, M.	Abdominal abscess . .	Abscess cavity opened and washed out	Tubercular peritonitis and meningitis.

EXPLORATORY (TABLE VIII.)

CASE 4.—Patient, on admission, complained of pain in lower abdomen, increasing in severity, also frequency of micturition accompanied by bearing-down pain and blood in the urine. There was some œdema of extremities. She had ceased menstruation for eight years. On examination, under an anæsthetic, the uterus was found to be very small and movable. To the right of it and slightly in front there was a hard irregular swelling about the size of a hen's egg adherent to the vaginal vault and probably extra-peritoneal. An irregularity could be felt in the posterior wall of the bladder, and the catheter came away full of almost pure blood. An exploratory ventral cœliotomy was performed, when it was found that uterus and appendages were atrophied. To the right side, and adherent to the wall of the pelvis, to the vaginal wall, and to other structures, a hard mass as large as a pigeon's egg was found. It was impossible to remove this, and the abdominal wound was closed with the intention of doing a vaginal operation later on, on the supposition that the hard mass was a calculus impacted in the ureter, which was considerably dilated above it. A colpotomy was performed twenty-one days later, but it was again found to be impossible to remove the mass and the patient was returned to bed. On discharge patient's bladder-symptoms were considerably improved.

DEATHS.

CASE 1.—This patient was operated on previous to Nov. 1st, 1896; but as her death occurred on Nov. 7th we have included her in our mortality table. A vaginal hysterectomy was attempted, but owing to a large number of adhesions it was not proceeded with, and the operation had to be completed by a ventral hysterectomy. Patient lost a considerable amount of blood, got uncontrollable diarrhœa in addition to bronchitis, and died ten days later. There was no peritonitis.

CASE 2.—With a history of three years' growth, the tumour reached almost to the ensiform cartilage, filling the pelvis and abdomen; it weighed 16 lbs. The patient had been suffering from menorrhagia for some months previous to operation, and her condition was low. The operation was not difficult, but the patient could not stand the shock, and died fifteen minutes after being put to bed.

Case 3.—Complaining of menorrhagia and dysmenorrhœa, she was curetted on Jan. 25, 1897, and as a considerable quantity of thickened endometrium was brought away with the curette iodine was injected. The temperature commenced to rise on the next day, and reached 107·8° F. with a pulse of 130 on the fifth day. Notwithstanding uterine douching, and plugging with iodoform gauze, the patient died on the sixth day. *Post-mortem* showed no pathological change except in the spleen, which was large and hard, and contained a small infarct.

Case 4.—For the past four months she had almost continuous hæmorrhage and severe pain; her uterus was myomatous, and both tubes enlarged. On opening the abdomen the pelvic contents were found universally adherent. Many of these adhesions were broken down, and both tubes and ovaries removed. Two days later patient commenced to vomit. Vomiting became incessant, the bowels could not be moved, and the abdomen became tympanitic. Intestinal obstruction was diagnosed, and when the abdomen was re-opened a coil of intestine was found bound down by a band of adhesions causing complete obstruction; this was separated; she, however, did not recover.

Case 5.—This patient was admitted to hospital with acute general peritonitis; temperature, 103·2° F.; pulse, 120. There was an old prolapse of the uterus, with a sloughing ulcer on the cervix. The uterus was explored with a curette, and found empty. After consultation it was decided to open the abdomen and wash out the peritoneal cavity as a *dernier ressort*. In addition to general peritonitis the abdomen was full of fluid and lymph, which was washed out, the abdomen closed, and a drainage tube inserted. Patient died the same night.

Case 6.—Tumour was the size of a full-time pregnancy, and before it could be removed from the abdomen twenty-two cysts were opened and evacuated. There were several adhesions binding the tumour posteriorly; there was a large cyst found adherent in Douglas's pouch, and this was opened and removed. The temperature commenced to rise immediately after the operation, but never exceeded 101·6° F. Pulmonary symptoms supervened; she was seen in consultation, and septic pneumonia was diagnosed. She died on the eighth day.

Case 7.—Myomatous uterus extending to umbilicus, and causing œdema of lower extremities and difficulty of micturition.

Patient took the anæsthetic badly, in consequence of which there was considerable handling of intestines. On the fourth day she became very restless, and suffered from hiccough, but there was no vomiting; the bowels could not be moved. She died the next day. Temperature and pulse normal. The *post-mortem* examination revealed nothing abnormal; the intestines were greatly distended with gas.

Case 8.—Myomatous uterus extending almost to the ensiform cartilage, causing persistent and excessive hæmorrhage. She was extremely anæmic from the continuous loss of blood extending back for nearly twelve months, and had suffered from menorrhagia for the previous two years. The usual operative procedure for panhysterectomy was followed, but the loss of blood during the operation proving too much for her, she gradually collapsed, and died just at the conclusion of the operation.

Case 9.—This patient was admitted with a temperature of 103·4° F., pulse 140, five weeks subsequent to confinement, with a history of "fever" and rigors from that time. The temperature continued high, and there was considerable abdominal swelling, from which the uterus was free. The swelling extended from above the pelvic brim to midway between the umbilicus and ensiform. On opening the abdomen a large quantity of foul-smelling pus escaped (about three pints); the intestines were adherent to the abdominal wall, and in making the incision a coil of the small intestine was opened and was stitched. The patient progressed favourably for a fortnight after the operation, the cavity continuing to discharge thin pus. The wound, except at the point of drainage, healed by first intention. At the end of this time she began to complain of persistent neuralgia in the head, with marked slowing of the pulse. The neuralgia would not yield to any treatment, the temperature began to rise, and the urine was highly albuminous. She continued to get worse, and four weeks after her operation the note recorded as to her condition is as follows:—"The patient has been in a semi-comatose condition for the last twenty-four hours, has ptosis of the right lid, strabismus, nystagmus and paralysis of the left side of her body, the bowels have not acted for several days, and the enemata administered have not been retained." She died the succeeding day. *Post-mortem* examination showed general tubercular peritonitis, with the abdominal contents matted together. On the right side the tube, which was

much distended with pus and 7½ inches long, opened into an abscess cavity in the right lumbar region. The left tube, also distended with pus and of almost a similar length, was adherent to a coil of intestine in the pelvis, where it had ruptured, allowing a large quantity of thin pus to escape. Permission could not be obtained to open the cranium.

Dr. Macan said that, as an old Master, he would like to offer his congratulations to Dr. Purefoy upon the success of his first year. He did not agree with Dr. Purefoy in his four hours' teaching of putting on forceps in the second stage. He thought that every student should be given absolute indications for putting on forceps. If the head was already far down in the pelvis, the os fully dilated, the occiput turned towards the front, and the outlet not very narrow, the forceps would do no harm. Most authorities now recognised that the application of the forceps is a bloody operation; there is a good deal of tearing and hæmorrhage caused by them. Regarding the case recorded where a woman had four dead-born children, the fifth a breech and living child, and now in sixth labour, he himself would have turned it into a breech instead of performing perforation and craniotomy. As regards rupture of the uterus, it was sometimes caused by attempting to pass in the hand in case of a shoulder presentation when the child was dead. As regards morbidity, the limit of normal during his Mastership was 100·4, instead of 100·8 as at present. The total monthly morbidity was given, but not the percentage of the cases, and, therefore, it did not help much unless the number of patients delivered in the month was stated. He saw in the Report no mention of cases of accidental hæmorrhage where the membranes were ruptured. Such cases were very troublesome, and difficult to treat. Cases where the membranes were still intact were treated by plugging the vagina, and perhaps even the cervix, but in the serious cases plugging would only increase the internal hæmorrhage. Nor would the application of a tight abdominal band and a vaginal plug be sufficient. He was tolerably content with the treatment of eclampsia by chloroform and chloral hydrate in large doses. There was no objection against morphia as well. In the reported case where morphia was given by Dr. Purefoy, why was not more morphia still given, seeing that the patient was maniacal? He thought that the essential treatment by morphia was to give very

large doses so as to prevent convulsions; three grains a day might be given. Regarding incubators, Anvard's, and afterwards Hearson's, were used in the Rotunda. He asked what were the modern improvements in incubators?

Dr. A. Smith said that in the application of forceps the time test was very limited and begs the question; the condition of the parts must be normal. The proper tests were conditions on the part of the mother and conditions on the part of the child. If the mother's temperature was raised, and pulse quick, or if the child showed pressure effects, such as quickening or slowing of heart, and meconium passing away, with vertex presenting, the forceps should be used. In the Report it was an interesting point that in each case of accidental hæmorrhage strong labour pains were present. The patients had strong labour pains, or the pains came on after treatment, such as plugging. Was the plugging in these cases the cause of strong labour pains or not? In the case of eclampsia he did not think that the morphia had been administered in the proper method, nor was it Veit's method.

Dr. Smyly was struck at the steady increase in the deliveries in the Rotunda. There was also a decrease in the mortality, mainly due to antisepsis and asepsis, but also due to the discipline in the hospital. Results in private practice were not at all commensurate with those in hospital practice, chiefly, he thought, due to the rules being carried out in a perfunctory manner. Regarding mortality, in contrast to the results of late years, he read the following from an old Rotunda Hospital Report:—

In 1869	there were	1,159	deliveries with	25	deaths.
„ 1870	„	1,087	„	27	„
„ 1871	„	1,161	„	33	„
„ 1872	„	1,193	„	20	„
„ 1873	„	1,191	„	32	„
„ 1874	„	1,236	„	15	„

The indication for the use of forceps was a very great difficulty. If everything was favourable, it was cruelty to leave the woman to suffer longer than was necessary. He believed that in rupture of the uterus the classical symptoms were frequently absent, giving one remarkable case to illustrate this. He had never found rise of temperature much of an indication for the use of forceps, as rises of temperature were generally due to vaginal examinations. He did not see why a macerated fœtus should cause a rise of temperature as stated in the Report.

Dr. E. Hastings Tweedy was glad that Dr. Purefoy was against the use of the curette in the treatment of abortion, as advocated by one speaker at the last meeting. The curette was apt to scrape away the muscular tissue and leave placental tissue behind.

Dr. F. W. Kidd said that formerly the fact of a man being master of a lying-in hospital was against his private practice on account of his being daily in touch with septic cases. Now, however, as shown by statistics, a lying-in hospital was the safest place for a woman to be delivered in. He thought there was some serious mismanagement in connection with private cases, probably because the nurse did not carry out the rules as she would under a matron in hospital. With regard to the use of forceps he would steer a middle course and would not adopt the four-hour system, nor would he leave a woman in labour for 36 or 48 hours, simply because no indication arose. Certainly it destroyed the patient's powers of resistance. Regarding the removal of retained membranes, not accompanied by hæmorrhage, he thought it better not to introduce the hand to remove such.

Dr. Purefoy, in reply, said that he did not adhere very strictly to the four hours second stage limit, and the application of forceps was carried out with due regard to the other conditions present. Laceration and subsequent hæmorrhage were not so frequent as Dr. Macan led one to believe. He believed that lesser degrees of rupture of uterus occur which pass unobserved at the time. Regarding the particular case of rupture of uterus reported, the patient was carefully watched, and the fact that she had been delivered on a previous occasion gave him hope that by allowing time for the head to mould, the patient would be all right. The process of rupture is very slow in such cases, and until the tissues are actually worn through, serious collapse does not arise. Regarding morbidity and range of temperature, he believed that the range of temperature was that accepted in other institutions, and was that accepted in Winckel's book. Concerning accidental hæmorrhage he fully agreed with Dr. Macan. In bad cases he thought he would use a tampon, in order to excite uterine action. The best treatment of such cases was, he thought, still an open question. He thought chloroform in the treatment of eclampsia more valuable than Dr. Smyly was inclined to admit. Venesection in some cases was useful. He rather dreaded chloral hydrate in the doses commonly recommended. If he used morphia he gave

first of all a large dose, and a somewhat smaller dose repeated in about two hours, or a shorter interval if the symptoms were severe. If the first dose ameliorated symptoms, the second dose was postponed. In the recorded case no eclamptic seizures occurred after the administration of morphia, and the maniacal condition was not formidable to life. He thought that an elevation of temperature occurred tolerably often in cases of macerated fœtus.

AN UNUSUAL CASE OF HÆMATOMA VAGINÆ.

By HENRY JELLETT, M.D. (Dubl. Univ.), M.R.C.P.I.;
Assistant Master, Rotunda Hospital.

[Read in the Section of Obstetrics, May 27, 1898.]

The following case of *hæmatoma vaginæ*, occurring previous to the onset of labour, may be of interest. I do not think a similar condition has been described before.

Case.—Mrs. M'C. was admitted to the Rotunda Hospital on December 24th. She stated that she was more than eight months pregnant, and that a swelling had come down through the vulva during the last few days. Thinking that it was probably a case of prolapse of the cervix, I had her brought into the surgery for examination. The condition then found was as follows:—A dark purple mass with a sloughing surface was protruding through the vulva. It measured about four inches in its greatest length, which lay parallel with, and midway between, the labia; and from side to side it measured about two inches. It was firm in consistency, apparently composed of coagulated blood, and covered with thrombosed veins. On making a vaginal examination the tumour was found to spring from the posterior vaginal wall, or, perhaps I should rather say, to be the everted posterior vaginal wall, and on drawing the tumour downwards the normal tissue above it could be brought into view. On passing the finger into the rectum the latter was found to bulge into the base of the swelling. It was obvious, then, that the enlargement had been caused by the rupture of a vein beneath the posterior vaginal wall. The escaped blood clotted, and so checked further hæmorrhage, but by its weight caused the vaginal wall to prolapse and so form a rectocele. In this connection I may mention that the patient expressly stated that she had had no previous prolapse of either vaginal wall. The uterus was about the size of a full term pregnancy, and there was a great mass of varicose veins covering the labia. The patient could give no account of the origin of the tumour, except that she had found it there three days previously.

As the mass was completely strangulated and was commencing to slough, I thought the best course was to remove it. This was easily done by making an elliptical incision at either side at the margin of the healthy tissue. The mass was then detached by pushing the rectum off it with the finger. The hæmorrhage, which was very free, was temporarily checked by an assistant seizing between his fingers the vaginal wall at the upper angle of the mass. The edges of the incision were then brought together by means of a continuous suture, which also took up the raw surface between them. This finally checked the hæmorrhage, and the result was similar to that after a posterior colporrhaphy. I removed the sutures on January the 4th, the tenth day after the operation, and the wound was then well united. On January 8th the patient came into labour, and was delivered of a full term child. There was no hæmorrhage to signify, and no attempt at the formation of another hæmatoma, but the cicatrix, which was too recent to be very firm, gave way, and, consequently, required re-suturing. The patient had a normal puerperium, and left the hospital perfectly well.

SECTION OF PATHOLOGY.

A CASE OF HYPERTROPHIC OSTEO-ARTHROPATHY, DUE TO COMBINED TUBERCLE AND CANCER OF ONE LUNG.

By JOSEPH O'CARROLL, M.D., F.R.C.P.;
Physician to the Richmond, Whitworth and Hardwicke Hospitals;
Physician to the Children's Hospital.

[Read in the Section of Pathology, November 5, 1897.]

After the ordinary period of growth which ends in complete manhood, further increase in the size of organs or other parts may occur as a result of various causes. Some of these further developments answer to increased use or function; others are morbid, the consequence of local or remote disease. Among the morbid forms of overgrowth come various enlargements of the limbs—such as simple gigantism, acromegaly, and those resulting from chronic pulmonary disease, and perhaps other causes not fully recognised or understood. The case I put on record is an example of hypertrophic osteo-arthropathy, associated with pulmonary disease, with such additional interest as attaches to the fact that the lungs were invaded by a combination of tubercle and cancer.

History.—P. M., aged forty-eight, about 68 inches high, for the past thirty years a fireman in the Dublin gas-works, was admitted to the Richmond Hospital under my care on Aug. 14th, 1896, and he died there exactly a year and a day later. He complained at first of pains in his joints, especially the wrists and knees, which had troubled him for eight or nine months, and most in wet weather. He had had a severe hæmoptysis about a year before he came to us, and this had been followed by a cough which he had never got rid of.

On admission it was noticed that his hands and feet were unduly large, the wrists and ankles were proportionally still larger, and were rounded and shapeless; the knees also were somewhat broad. The face showed no disproportionate growth of any part, such as occurs in acromegaly, and examination of the eyes by Dr. Swanzy, who has written so well on this subject, revealed no symptom suggestive of pituitary hypertrophy.

Examination of the chest revealed an abnormal condition of the upper half of the left lung, which thenceforth may be said to have passed through many diagnostic vicissitudes. It was at first distinguishable from the emphysematous right lung by its faint breath-sounds and lack of percussion resonance. Some chronic consolidation was guessed at. Some time later it was decided to be cancerous because of greatly-increased dulness and resistance of the upper intercostal spaces. Then it became resonant and flattened, and gave all the signs of tubercular excavation except the bacilli in the sputum, which were searched for a few times and not found. Finally, the diagnosis of a malignant neoplasm was resumed, when it was seen that the ribs in the left axillary region were manifestly the seat of a new growth.

Necropsy.—Brain not examined; left lung consisted practically of a thin bag of lung tissue firmly adherent throughout to the parietes, and containing in its centre about a litre of pus. The wall of this huge abscess was cheesy, and the cavity was bridged in several places by cords which were found on section to be blood-vessels with caseating walls. The right lung was large and œdematous, but not diseased. The 3rd, 4th, and 5th ribs, and the corresponding intercostal spaces, were occupied midway between the angles and the cartilages by a tumour measuring about three inches each way, projecting into the thorax and outwards under the skin. The left kidney was also reduced to being a bag of pus; the ureter was dilated in its upper half, and at its middle was lodged a stone about 12 mm. long by 5 mm. thick. The other organs were normal.

Microscopic examination made by Professor O'Sullivan:—"The tumour of the ribs was a carcinoma, with large alveoli and irregular, partly degenerated cells. Various sections through the lung, at some distance from the root, showed a similar cancer side-by-side with tubercular changes, the cancer being the more prominent. A bronchial gland showed cancerous and tubercular change

in the same section." A dissection of the limb lesions was not permitted.

The photograph of a cast of the man's hand shows fairly well the bulbous fingers, but it fails to show satisfactorily the rounded or square section of the wrist, which was almost as thick from front to back as from side to side. The measurements were $3\frac{1}{8}$ inches from side to side, and $2\frac{1}{4}$ inches from front to back. I regret that I had not a skiagraph taken; it would, perhaps, have given some information as to the tissues involved in the hypertrophy.

DR. O'CARROLL ON HYPERTROPHIC OSTEO-ARTHROPATHY.

INTRA-OCULAR FOREIGN BODY.

By ARTHUR H. BENSON, F.R.C.S.;

**Surgeon, Royal Victoria Eye and Ear Hospital, Dublin (St. Mark's);
Ophthalmic Surgeon, City of Dublin Hospital.**

[Read in the Section of Pathology, December 3, 1897.]

THE case which I present is of interest, as showing how a foreign body can become encapsuled within the globe. A man, aged sixty-nine, who was admitted to St. Mark's Hospital, November 9th, 1897, stated that 14 years previously he had been struck by a splinter of iron in his left eye, which became blind, but that it had caused no annoyance or pain to him until very recently, when it got red, inflamed, and terribly painful. When first seen by me the left eye was very painful—tension + 1 or more, and vision = 0. There was considerable zonular vascularity, and no illumination of the fundus could be obtained. There was iridodonesis, probably due to dislocation of the lens, and through the transparent cornea could be seen, in the anterior chamber, floating about in the aqueous, a little spongy-looking mass, about 2 mm. in diameter, and of a rusty colour. This could still be seen in the hardened eye through the transparent cornea, as the specimen was preserved in a 1 per cent. formol solution. On examination I could find no nebula of the cornea, or mark on the sclerotic indicating that any foreign body had ever penetrated the globe. The eye was enucleated, because it was blind and very painful; and it was only on looking at the globe after its removal that a little black hemispherical tumour was seen on the sclerotic, about the size of a grain of No. 1 shot. This I took to be a sarcoma protruding through the sclerotic, forgetful of, or discrediting the history of, the injury fourteen years ago.

The globe unopened was hardened in 1 per cent. solution of formol and given to Professor Scott, and it was only when he tried to make a section of the tumour that he found that it was by far the hardest tumour he had ever tried to cut, and no wonder, for it contained in its centre a mass of iron, which must have lain buried in the eye, encapsuled, for fourteen years. The symptoms were, therefore, not due to a sarcoma, but to a foreign body encapsuled in the sclero-choroidal layers, and the tumour which protruded from the surface of the sclerotic was but the thinned and pigmented wall of the capsule which contained the iron, and on the inside of the globe a corresponding protrusion of the choroid was visible. The iron had not changed to rust, and still retained, after fourteen years, its magnetic qualities.

Professor Bennett, in referring to Mr. Benson's case, said that it reminded him of a case formerly under his care. A man came to hospital with a tumour on his forearm, which was rather recent in development. On making an incision, a soft mass of organised tissue sprang into the incision, and the tumour seeming to be then sarcomatous, both he and his colleagues thought it best to amputate through the elbow. Fortunately, however, on passing his finger into the wound, it grated against something, and a long needle having been taken out, the "sarcoma" immediately disappeared.

Mr. J. B. Story thought that Mr. Benson's case showed the mischief done to an eyeball by a foreign body consisting of iron. It was well known, he said, that a perfectly aseptic piece of iron in the eyeball sooner or later leads to changes which terminate in the complete abolition of sight, and in the destruction of the interior tunics and contents of the globe. Chemical changes occur and set up chronic inflammatory changes which result in the deposition of iron pigment all through the contents of the globe; the iron pigment even makes its way into the interior of the lens. Certain chemical reactions serve to distinguish this pigment from the ordinary pigment in the eye. The iron pigment reacts with ferrocyanide of potash and hydrochloric acid in a way in which ordinary

intra-ocular pigment does not. Also, the latter pigment is bleached by chlorine gas, whereas iron pigment does not react in the same way to chlorine.

Mr. Maxwell spoke.

Dr. McWeeney said that with regard to the siderosis reaction he quite agreed with Mr. Story. With the cyanide reaction, one should get a reaction with the introduced iron; whereas it was well known that the pigment of the choroid would not give any reaction; so, accordingly, it should be a very interesting experiment to try.

Mr. Benson, replying, said it was a remarkable fact that after fourteen years the eye had undergone so little apparent change after the introduction into it of a piece of iron. There was very little appearance of rust about the iron, and it still attracted a magnet, and, therefore, had not undergone much chemical change.

UNRUPTURED ANEURYSM OF THE LEFT VENTRICLE OF THE HEART; SUDDEN DEATH.

By J. J. BURGESS, F.R.C.S.I., L.R.C.P.I.

[Read in the Section of Pathology, December 3, 1897.]

THE case which presented the following specimen was that of a lady, aged eighty, who up to 8th November was in the enjoyment of good health, and was wont to boast "she never troubled much a doctor."

On this morning her maid, as usual, brought up the old lady's breakfast, which she was in the habit of partaking of in bed for several years, rising immediately afterwards. She appeared in her usual health and spirits, but when an hour and a half had passed without any summons for her servant, the latter went into the room, and was shocked to see her mistress lying forward quite dead.

With the permission of her relatives I made an autopsy fourteen hours afterwards. The body was that of a tall, well-nourished woman, no marks of violence, a small chronic ulcer on the inner surface of right leg, and with moderate *rigor mortis* present. Under the integuments there was a thick layer of fat.

On opening the thorax both lungs were emphysematous; the right was adherent to the costal pleura to a considerable extent of its lower anterior surface. There were small adhesions on the left side, but none of any such size as on the right. The pericardium appeared normal; was nowhere adherent. The surface of the right ventricle and auricle was embedded in fat. In tilting the heart over I was struck by the appearance of the left ventricular wall just above the apex. In the specimen before you this is to a great

extent lost, owing to its immersion in spirit. At the time it presented a projection like the rounded end of a hen-egg, the surface feeling like tissue paper, in marked contrast to the firm feel of the hypertrophied ventricle around.

On section both ventricles show well-marked fatty change; the valves are healthy. The left ventricle is hypertrophied; its cavity appears double—*i.e.*, the ventricle proper and the aneurysm, which latter, in the fresh specimen, was capable of containing about half an ounce. You will see there is a small somewhat tendinous aperture of communication in the muscular structures. Then comes the aneurysm, with laminated clot and walls composed only of epi- and endocardium.

We have not far to seek for the cause of this condition. You will remark the extreme thickening of the right posterior coronary artery in the sections:—

(1.) At its origin from the sinus of Valsalva;

(2.) In the centre of its course when its cavity is almost obliterated; and

(3.) In the vicinity of the aneurysm, where it is practically solid.

The continuous trunk of the vessel ought, in its normal course, to pass over the diseased area.

The left (anterior) coronary, although likewise thickened, presents no such external narrowing in the posterior branch. In this case there was no reason to suspect syphilis—the common cause of thickening of the intima—therefore the arteritis deformans was atheromatous in origin. In the zona tendinosa of the mitral valve there is a calcified nodule the size of a pea.

Legg, in the Bradshaw Lectures, 1883, on this subject, speaking of the rarity of this condition, says that of 1,890 *post-mortems* at St. Bartholomew's, there were only three examples of aneurysm of the left ventricle. He further

states that it is most common between forty and seventy, differing from Turnham, who was of opinion that it was a disease of early life, between twenty and thirty.

Its ætiology is due to either fatty degeneration or fibroid disease of the cardiac wall, which, according to Pye-Smith, may be set up by four causes :—

(1.) Myocarditis, rheumatic or spontaneous.
(2.) Syphilis.
(3.) Thrombi in apex of ventricle.
(4.) Degeneration of wall caused by want of blood supply, corresponding to the infarction theory of Cohnheim.

Dr. McWreney said that the specimen was a very rare and interesting one. He thought there could be no reasonable doubt but that the condition of the coronary arteries had really been one of the principal causes of the weakening of the wall of the heart. The coronary artery of that side went directly to the very place where the commencement of the aneurysm was situate, and transverse section of the coronary artery showed that the lumen was enormously encroached upon. The outside thickness of the vessel was rather greater than normal, whereas, the aperture through which the blood had to go did not admit of anything larger than a pin being passed through. The great thickening in the wall appeared to consist almost entirely of a proliferation of the intima. Were it not for the history, he should almost have been inclined to look upon the arterial disease as of syphilitic nature.

A CASE OF ADENOMA OF THE LIVER, ASSOCIATED WITH CIRRHOSIS.

By HENRY T. BEWLEY, M.D.;
Physician to the Adelaide Hospital.

[Read in the Section of Pathology, January 14, 1898.]

A GERMAN, aged forty-five years, was admitted to the Adelaide Hospital, under my care, on May 26, 1896. He stated that, although he had been in the habit of drinking beer freely, he had been in good health till about the end of April, when he found his abdomen beginning to become swollen; his legs shortly afterwards also became swollen. When admitted he had a large amount of ascitic fluid in the abdomen, and his feet were slightly œdematous, but, otherwise, nothing amiss could be detected.

During June, 1896, I twice introduced a trochard and canula through the linea alba; but, though physical examination showed the presence of abundant fluid in the peritoneal cavity, none came through the canula. Subsequently, at the *post-mortem* examination, the omentum was found to be very long; I suppose it must have blocked the canula.

He improved somewhat, and left hospital, but was re-admitted on August 18, 1896, and on account of his great discomfort was tapped next day, 10 pints beingdrawn off. After this he remained in hospital, and was tapped regularly every fortnight, from 10 to 13 pints being removed each time. A remarkable feature was the rapidity with which the abdomen filled after each tapping. You might tap him in the morning and draw off all the fluid that would come, in the evening the abdomen would be again distended; and next morning you would find him nearly as tense as before the tapping.

His urine was generally very high coloured, but was otherwise normal, as also his heart, lungs, and other viscera appeared to be. He gradually became weaker, and died on April 26, 1897, having been tapped, I think, seventeen times in the eight months.

At the *post-mortem* the spleen and liver were found almost equal in size, the spleen being hard and firm, while the liver was

smooth on the surface and very tough. Microscopical examination shows the cirrhosis to be in considerable degree monolobular, and so the contraction of the liver was fairly even and uniform.

As we were cutting into the liver we came on a round pale-coloured mass, about 1½ inches in diameter, surrounded by a smooth and distinct capsule. This mass was exceedingly soft, having about the consistency of well-boiled stirabout. It broke down under the least pressure, and did not appear to the naked eye to have any structure. We thought it was some kind of retention cyst, or something of the kind, full of soft *débris*, and put a little bit under the microscope to see what kind of *débris* it was. To our surprise the mass consisted of perfectly formed epithelial cells, with one or two well-staining nuclei in each.

Dr. Scott, although with considerable difficulty, on account of the softness of the tissue, succeeded in making sections, showing the mass to be an adenoma of the liver.

It consists then in polygonal epithelial cells, irregular in size, but many of them rather larger than the normal liver cells. Some contain two nuclei. These cells appear in places to be disposed irregularly, but generally they tend to form columns of about the thickness of two cells. There is in some places the appearance of a space or lumen between the cells, but I think this is only due to the shrinkage of the cells in hardening. There is hardly any connective tissue between these columns of cells, and there are but very few blood-vessels. The tumour is sharply cut off from the liver substance by its capsule. But for this the tumour might be considered a carcinoma, as its microscopic structure is not distinguishable from some very soft cancers. We found no trace of any similar growth elsewhere.

Adenoma of the liver appears to be a rather rare tumour. Such is the opinion of Ewald, Birch-Hirschfield, Ziegler, and others. Hamilton, on the other hand, says "adenoma-like masses are often seen in the cirrhotic liver." As far as Dublin is concerned, this statement seems to be misleading. Cirrhosed livers are fairly common; but several hospital physicians of large pathological experience have told me they had not before seen a growth like this.

Adenomata are generally multiple, forming small tumours

up to the size of a cherry, scattered all through the liver. From the anatomical point of view they appear to be of two varieties—(1) Those tumours the arrangement of whose cells corresponds more or less to the normal arrangement of the liver cells, and so lie in more or less solid columns. (2) Tumours composed of tubes, convoluted or fairly straight, lined with a single row of cubical epithelium cells, and containing a distinct lumen. A section of such a tumour is compared by Ewald to a section through the cortex of the kidney. My case belongs to the first variety.

As to the origin of these tumours, in some cases their existence seems connected with the cirrhosis which often coexists. Pieces of liver tissue become surrounded by cirrhotic bands, while the rows of liver cells retrograde into bile-duct-like structures (Hamilton). In other cases there appears to be a true outgrowth of rudimentary bile ducts from those already present.

These adenomata generally, as in my case, give rise to no symptoms, but occasionally, growing to a large size, cause ascites or other symptoms. In some cases secondary growths in the lungs have been described; but it is, I think, doubtful if these should be at all classed with the adenomata.

TWO CASES OF CHOROIDAL SARCOMA.

By ARTHUR H. BENSON, F.R.C.S.;

Surgeon, Royal Victoria Eye and Ear Hospital (St. Mark's);
Ophthalmic and Aural Surgeon, City of Dublin Hospital.

[Read in the Section of Pathology, January 14, 1898.]

FUCHS has observed four stages in the life-history of choroidal sarcomata:—

1. When the tumour is small, and the retinal detachment is small, and there is great danger of mistaking the case for one of *simple detachment*, the intra-ocular tension being normal.

2. Where high tension follows, with opacity of the media, and the diagnosis of *acute glaucoma* is probable.

3. Where the tumour perforates the sclerotic, and commences its more rapid extra-ocular growth.

4. The stage where generalisation of the tumour takes place by metastatic extension.

Both the specimens which I show to-night belong to the second stage, where the growth is confined entirely within the sclerotic.

CASE I.—E. M'E., a girl, aged twenty-two, was admitted to St. Mark's Hospital, December 14th, 1896, sent by Dr. Robinson, of Newry. When admitted there was in the right eye a corneal staphyloma, a high tension (+ 1 or more), and the vision was absolutely nil. The disc was of a greyish colour, indistinctly seen, and the retina was detached. The left eye was tolerably normal in appearance, but the vision was only $\frac{6}{36}$, and the tension was normal.

The presence of any definite growth was not diagnosed, but enucleation was done to relieve the pain, as the eye was absolutely

sightless, and the possibility of a tumour is always present in such cases.

On opening the eye a large portion of the choroid was found to be thickened in a more or less crescentic way, the thickening being greatest near the ciliary body, and getting regularly and gradually thinner towards the equator. There were no nodules at all, and until a cross section was made the presence of a definite tumour was impossible to ascertain.

The tumour is more or less diffusely extended over quite a large portion of the anterior portion of the choroid, possibly originating in the ciliary body, is deeply pigmented everywhere, and, as can be seen in the sections, is a spindle-celled melano-sarcoma.

I have just heard that this patient has since enjoyed good health, and shows no sign of recurrence. The age of this patient—only twenty-two—and the indefinite shape and limits of the growth are points of interest.

Case II.—K. F., a woman, aged fifty-two, was admitted to St. Mark's Hospital on March 5th, 1896. She had been at the hospital first in December, 1895. She then stated that she had first noticed her sight getting bad in May, 1895, and from that on it got steadily worse and worse as regards the sight. She had no pain at that time.

On February 2nd, 1896, three large retinal detachments were seen with the ophthalmoscope, and hæmorrhages were visible on the parts of the retina between the detachments. Left V. = p. c., T + ? Right V. = $\frac{6}{18}$, Tn.

By February 29th, 1896, the anterior chamber was totally obliterated. There was zonular vascularity, commencing ulceration of the cornea below, the lens was getting cataractous, and T. + 2. The tension soon rose to + 3, and on admission vision was totally gone. This was ten months from the time she first noticed the eye defective. Enucleation was at once done. The exterior of the globe and the optic nerve seemed normal.

On opening the globe a quantity of straw-coloured (sub-retinal) fluid escaped. The retina was totally detached in a funnel shape, and a tumour about the size of a good pea, almost spherical and distinctly pedunculated, was found attached to the choroid, close to the optic nerve entrance, and protruding into the interior of the globe.

Under the microscope will be seen sections which show that the case is one of round-celled leuco-sarcoma, and suggests fairly rapid growth compared with the first case. The characteristic shape of the growth and the entire absence of pigment in it are of interest.

I wrote to her the other day to enquire regarding her present condition, and heard that she has since been "quite well."

Ten months had elapsed from the first eye symptom before enucleation, and a year and ten months has elapsed since the operation without there being any sign of recurrence.

Sarcomata of the eye are amongst the rare diseases; roughly speaking they occur only about once in every 2,000 cases of eye disease. They are commonest between the ages of forty and sixty, and are very rare in childhood.

Fuschs found sarcoma of the iris in 6 per cent., sarcoma of the ciliary body in 9 per cent., and sarcoma of the choroid in 85 per cent., and 13 per cent. of recurrences mostly occurring within a year.

In the first stage the percentage of recurrences was 0; in the second stage, 5 per cent.; and in the third stage, 22 per cent. The probabilities therefore are in favour of my second case not getting a recurrence.

The specimens which are under the microscopes were kindly prepared for me by Professor Scott.

Mr. Croly wished to know was it in the brain or in the other eye that recurrence took place after removal of the contents of the orbit for sarcomatous tumour. Sarcomatous tumours were not likely to recur in their original positions, and sarcomatous tumours spread through the blood-vessels, not the lymphatics. It was his experience to find sarcomatous tumours in the young, and he had seen sarcoma of the tonsil at seventeen years of age.

Dr. Benson, replying, said that in talking of recurrence he alluded to local recurrence. Of course, in eye cases general

recurrence occurred also, and that came into Fuschs's fourth stage generalisation. Intra-ocular sarcomata recurred in young people, but very much more commonly in older people. If, in removing the eye, the optic nerve was found implicated, as much of the latter as possible was also removed; but extirpation of the orbit was an impossible thing to do completely, and some of the diseased tissue was liable to get squashed into some of the crevices in the neighbourhood.

THE PLASMODIUM MALARIÆ.

By JAMES B. COLEMAN, M.D., R.U.I., M.R.C.P.I.;
Physician to the Richmond, Whitworth, and Hardwicke Hospitals; Physician to the National Hospital for Consumption for Ireland.

[Read in the Section of Pathology, February 25, 1898.]

WHEN we consider the very wide geographical distribution of malaria, and the vast amount of suffering which it entails on its victims, we have reason to congratulate ourselves that Ireland is free from the disease. But our country did not always enjoy such immunity, and even during the early part of the present century ague was not uncommon in the neighbourhood of Dublin. The following passage occurs in Graves' "Clinical Lectures," which were delivered in 1848:—"There can be no doubt that in Ireland, as in other countries, the effects of cultivation and drainage on the health of the inhabitants are very remarkable, and I myself have witnessed several exemplifications of the improvements thus effected. Formerly ague was of rather common occurrence in some marshy districts in the immediate vicinity of Dublin, and consequently when I was a pupil cases of intermittent fever were to be met with in the hospitals; now the low grounds have been drained, and thus the production of ague has been arrested. It may be cited as a proof of the former frequency of ague in Dublin that when sulphate of quina had been discovered in France we in Ireland were amongst the first British physicians who verified its anti-aguish powers." In another lecture Graves says—"In Ireland we seldom meet with cases of ague with paroxysms so violent as to endanger the patient's life. I lately, however, saw a case of this nature." He then gives particulars of a case of *tertiana*

soporosa which occurred in a gentleman in the neighbourhood of Donnybrook.*

Now-a-days the only instances of malaria seen in Dublin are furnished by patients who contracted the disease abroad. Although many important clinical facts in connection with malarial fever have been known from the earliest days of medicine, the study of the disease received a fresh stimulus from the introduction of Peruvian bark into Europe in 1640 by the Countess del Chinchon, wife of the Spanish Governor of Peru. Sydenham popularised the new remedy in England towards the end of the seventeenth century, and his writings, as well as those of Morton about the same time, evince an intimate clinical knowledge of the disease and of the therapeutical value of cinchona bark.

What may be described as the first step towards the detection of the malarial parasite was the discovery of pigment in the blood at the *post-mortem* examination of an insane patient by Meckel in 1847. In the next year Virchow found pigmented bodies in the blood of a dead malaria patient, and Hischl in 1850 wrote—"Uber Pigment-bildung nach Febris Intermittens." Planer in 1854 attributed some of the symptoms of malaria to the presence of pigment in the blood. A retrograde move was made by Klebs and Tommasi-Crudeli in 1879, when they erroneously described a bacillus as the cause of the disease. Their supposed discovery gained wide credence, and, consequently, when Lavaran, in November, 1880, announced that he had found living parasites in the blood of malaria patients, very little importance was attached to his statements. In 1885 Marchiafava and Celli gave their adherence in the main to Lavaran's views, and they called the small intra-corpuscular amœboid organism in the earliest stage of its development the *Plasmodium malariæ*. Golgi in 1885–6 ascertained that the regular quartan and tertian

* A suburb of Dublin.

intermittent fevers were caused by distinct varieties of the parasite, that the cycle of development of the tertian parasite was 48 hours, and that of the quartan 72 hours, and that the onset of the paroxysm coincided with, and depended on, the segmentation of groups of the parasites.

In 1889 Marchiafava and Celli, and Canalis described a distinct variety of the plasmodium in æstivo-autumnal (malignant) fever, but in 1894 the former observer and Bignami contended that the parasites concerned in the production of the malignant types of malaria were of two varieties.

Much still remains to be known regarding the life-history of the malarial parasite outside the body, and the subject is being investigated by able workers, amongst whom may be mentioned Manson and Ross.

The specimens which I exhibit illustrate the stages of development of the parasite of tertian ague. The patient was a soldier who contracted malaria in India. He came home in February, 1897, and he was admitted to the Whitworth Hospital in the following October with well-marked tertian intermittent fever. He had febrile paroxysms on the 3rd, 5th, and 7th of the month, and again on the 23rd, 25th, and 27th. The paroxysms began about noon, and lasted from ten to eleven hours, the maximum temperature reaching 105°. Although he was kept under observation for nearly three months and no quinine was given, the fever did not recur. The blood was examined at frequent intervals before, during, and after the paroxysm. In the fresh blood small hyaline amœboid bodies were seen within the red cells during the paroxysm, and stained preparations of the blood taken from the ear-lobe at frequent intervals before, during, and after the attack, show the growth of the parasite within the red blood corpuscle. In the blood taken from eight to twelve hours after the febrile paroxysm, the plasmodium is seen to be non-pigmented, small, globular, ring-like or irregular in shape.

Twenty-four hours after the attack it is larger, and pigment can be seen in it. Eight hours before the next attack it fills about three-fourths of the red cell, the pigment is very obvious, and it is distributed rather towards the periphery of the parasite. At the beginning of the attack the parasite fills the red cell, the pigment is collected into a central clump in some specimens, and in others the parasite has acquired the form of a rosette with 18 segments radiating from the central mass of pigment.

Prof. O'Sullivan showed specimens of the malarial parasite. The case was that of Dr. H., residing in the Chota Nagpur district in Bengal, who had contracted a simple tertian ague in December, 1896. The examination was confined to a single attack, which Dr. H. allowed to run its course without treatment. Shortly before the next attack was due he took quinine, and although the attack took place in a mild form, there were very few parasites to be found in the circulating blood, and shortly afterwards they had entirely disappeared.

The fit began at 1 p.m. on Saturday, December 18; blood was taken at 2 p.m., 4 45 p.m., and 11 45 p.m. on Saturday, and at 9 30 a.m. on Sunday.

Specimens taken at 2 p.m. (temperature 102°) showed chiefly a delicate ring form, half or less than half the diameter of a normal red corpuscle. The ring was circular or slightly oval, with a thickening at one side extending over one-third of the circumference, and a small, deeply-stained nodule opposite to the centre of the thickening. In a few cases the ring showed no thickening or nodule. In addition there were some segmentation forms, containing 17 to 20 spores in two rows, and pigment, which was in some cases diffused in coarse granules through the body; in others, collected in a ball in the centre. In the next two specimens (4 45 p.m., temperature 103·2°, sweating stage; and 11 45 p.m., temperature 98·5°) nothing but ring forms were to be seen, showing, however, signs of further development—*e.g.*, pigment granules in the thickened part and formation of a small, clear body, staining lightly with methylene blue at the side of the thickening. In some cases two rings and even three were found in the same corpuscle.

These joined at a point in their circumference at the edge of the thickening.

In the specimens taken at 9 30 a.m. on Sunday no ring forms were found; the thickening had developed into a pigmented body as large or larger than the original ring, traces of which, with its nodule, could often be made out.

Dr. E. J. McWeeney said he had never seen so beautiful a demonstration of the parasitology of malaria. What was particularly beautiful was the comparatively unstained appearance of the nucleus in each of the segments of the rosette to which Professor O'Sullivan had drawn attention. This nucleus of the protozoa, or, at any rate, of the lower protozoa, must be something quite different in its chemical characters from the higher series and certainly of the metazoa. This nucleus does not appear to contain chromatin, which has so strong an attraction for the basic anilins and for nuclear stains, such as hæmotoxylin and carmine. He asked what method they had adopted for fixing the blood specimens? The fixing was admirable and faithful, and the biconcavity of the blood discs extremely well shown.

Surgeon-General Potter did not think that the parasite was *different* in the *different* forms of malaria. He had himself suffered for years, more or less, from daily attacks of malarial fever, at times being confined to bed from very severe attacks. He thought that the expression "malarial poisoning" was the best name for the disease. Speaking generally, quinine was the best treatment, but, in some cases, quinine was absolutely useless, and then arsenic was often given with success. There was no doubt that malaria had a very injurious effect on the general health. He considered change of air as an additional treatment very good. He thought that the wearing of flannels had a most beneficial effect in warding off malaria and other diseases. Hypodermic treatment of ague had not given good results.

Dr. A. R. Parsons said that he had seen the parasite of malaria easily without staining with an ordinary one-seventh objective. In Dr. Coleman's specimen the adult parasite took up practically the whole corpuscle, there being merely a ring round, whereas, in Professor O'Sullivan's case there was comparatively little protoplasm destroyed. He was under the impression that as the tertian parasite grew it gradually destroyed the hæmoglobin and converted it into pigment till it had nearly the whole of the hæmoglobin destroyed; then showed a sporulation and the spores discharged into the blood

stream. Did Dr. O'Sullivan think that the parasite in his specimen would have gone on increasing in size?

The President of the Academy (Dr. Bennett) said that it was remarkable the way in which attacks of the fever were brought on by exposure to cold. On the theory of the parasite—what excited the growth of the parasite and what made it take on the form which produced fever owing to exposure to cold? As regards subcutaneous injection of quinine, he had seen a good deal of this himself, and the physicians in Bombay were well pleased with the treatment.

Dr. J. B. Coleman, in reply, said that his specimens were fixed by immersion for about half an hour in equal parts of absolute alcohol and ether. They were then stained with alcoholic solution of eosin, and, having washed off that, methylene blue was applied in concentrated watery solution. He could give no information as to the life of the parasite outside the body, but this subject was being worked at by Surgeon-Major Ross. Infection took place through the respiratory organs. It has been proved that drinking water from a malarial district does not produce malarial fever. Ingestion of blood from malarial patients has also failed to produce the disease, but the disease is constantly produced by intravenous injection of such blood. Replying to Surgeon-General Potter, he said that Golgi in 1885–86 differentiated the parasites of mild tertian and quartan fever; and Marchiafava and Celli and Canalis in 1889–90 discovered a distinct variety of the parasite in æstivo-autumnal fevers. Mild quotidian fever is due to the simultaneous presence in the blood of two generations of the tertian parasite, or of three generations of the quartan, each group being 24 hours older than the preceding one. In quotidian fever due to the tertian parasite a dose of quinine frequently checked the daily paroxysms by prolonging the interval to 48 hours; further administration of quinine cured the fever completely. The effect of quinine was to prevent the development of the young plasmodia. He agreed with Dr. Parsons that the fully-developed tertian parasite occupied the whole of the red cell. His case did not show segmentation occurring in the regular rosette form; but it must be remembered that in some cases of tertian ague segmentation occurred only in the spleen and bone marrow and internal organs, whilst cases of quartan fever seemed to have segmentation developed more frequently in the ordinary peripheral circulation. As regards the remarks of the President of the Academy

about exposure to cold causing paroxysms, he (Dr. Coleman) had noticed that himself.

Prof. O'Sullivan, replying to Dr. McWeeney, said the cover-glasses were fixed by heating to 115° C., and stained with methylene blue and eosin. In reply to Dr. Parsons, Prof. O'Sullivan said the forms found in the early stages corresponded closely with those described by Mannaberg as appearing in the quotidian and malignant tertian fevers, while the segmentation corresponded to the benign tertian, to which the clinical course of the fever, its amenity to quinine, the absence of crescents, and the sporulation in the circulating blood all seem to point. It was also remarkable that, although conjugation forms were present, resembling precisely those which Mannaberg has delineated as the antecedent to crescent formation, no crescents were found, in spite of repeated search during and for some weeks after the attack.

FRACTURES OF THE LUMBAR VERTEBRÆ AND OF THE SACRUM FROM DIRECT INJURY.

By E. H. BENNETT, M.D., F.R.C.S.;

President of the Royal Academy of Medicine in Ireland;
Surgeon to Sir P. Dun's Hospital;
Professor of Surgery, Trinity College.

[Read in the Section of Pathology, February 25th, 1898.]

On 8th February, 1897, a man, aged thirty, was admitted into Sir P. Dun's Hospital, suffering from injuries of his spine and pelvis. He died five minutes after his admission. He had been carried from a ship discharging grain in the Liffey, a distance of just half a mile. His body did not present any wound or marks of injury, but osseous crepitus was very distinct in the lumbar and sacral regions. Priapism was marked.

On inquiry from those who brought him to the hospital we learned that he had suffered the following injury:—The grain was being lifted from the hold of the ship by a steam engine raising at each lift sacks bound together in a parcel of two tons; as one of these was swung up the rope broke, and the parcel fell to the deck, crushing the man face downwards on the deck.

At the *post-mortem*, when the abdomen was opened, there was found no intra-peritoneal lesion, no blood, nor any laceration of any viscus. The peritoneum covering the lumbar vertebræ and the sacrum was projecting forwards, evidently by displacement of the vertebræ forwards, and by a great blood effusion. When the soft parts were reflected from the erector-spinæ grooves posteriorly it was found that the body of the second lumbar vertebra was almost completely separated from the first, and displaced forwards; with it the third, fourth, and part of the fifth lumbar vertebræ were detached in a single piece, and displaced forwards; the neural arches of the upper vertebræ and all the transverse processes were detached, and retained their relations to the torn muscles and fibrous structures. The sacrum, with a part of the fifth lumbar, was displaced forwards into the pelvic cavity. A vertical fracture passed down through the line of the sacral foramena on the

left side, detaching the bone from the left innominate; on the right side the sacro-iliac articulation was torn through, and only one small bony piece retained connection between the sacrum and innominate of the right side. So the sacrum was detached and displaced into the pelvic cavity. There were no fractures of the anterior arch of the pelvic girdle, nor of any part of it, except the sacral. I think the case is of interest because of the limitation of the fractures to the sacrum, and its displacement forwards without any other pelvic lesions. The cauda equina was greatly disordered, and the spinal canal was distended by a great blood effusion, which by its pressure on the cord seemed to be the immediate cause of death.

NOTE ON A SPECIMEN OF OSSEOUS ANKYLOSIS OF SACRO-ILIAC SYNCHONDROSIS AND HIP-JOINT OF SAME SIDE.

By JOHN KNOTT, M.A., M.D. (Univ. Dub.); M.R.C.P.I., M.R.I.A., &c., &c.

[Read in the Section of Pathology, February 25, 1898.]

The specimen which I have the honour to submit to the notice of the Pathological Section this evening came into my possession by accident. I possess no history: it was, I understand, originally procured from the dissecting-room, and passed through the hands of at least two other owners before it came into mine. It presents the peculiar complication of complete osseous ankylosis of both hip-joint and sacro-iliac synchondrosis on the left side; apparently, I should say, due to neglected tubercular inflammation. The hip-joint became fixed in a flexed position.

A specially interesting feature at once arrested my attention when I first saw the specimen. The pelvic portion agrees very closely with the appearances which characterise the condition described by Professor Naegelè as the "*pelvis obliquè ovata;*" and which was observed by him in his obstetric practice. The following is his description of the condition (from Dangan's translation) quoted by the late Professor Sir Edward Sinclair, in a paper on the subject which appeared in the *Dublin Quarterly Journal of Medical Science* (Vol. XX., 1855):—

"Complete ankylosis of one of the sacro-iliac symphyses, or perfect fusion together of the sacrum and one of the coxal bones.

"Arrest of development or imperfect development of the

half of the sacrum, and contraction of the anterior sacral foramina of the side corresponding to the ankylosis.

"The innominatum of the ankylosed side *and the sciatic notch of that side are smaller than those of the opposite side.*

"The sacrum seems pushed towards the ankylosed side, and its anterior surface appears more or less turned to that side; and, at the same time, *the symphysis pubis is drawn to the opposite side, so that the latter no longer corresponds directly, but obliquely, with the sacro-vertebral angle.*

"On the side where the ankylosis exists, the *lateral wall, and the portion of that side corresponding to the anterior wall of the pelvic cavity, are more plane* than in the normal condition.

"The other half of the pelvis—viz., that on which the sacro-iliac symphysis exists, though apparently so, is not really in a normal condition," for (according to Naegelè), "were two pelves, both affected with this species of deformity, only that the malformation existed on different sides, and if an accurate division was made with a saw, so that the section should pass through the mesial line of the sacrum, as well as the centre of the pubic symphysis in each; and that then the two apparently properly-formed sides were brought together at the cut surfaces of the semi-sacrum, it would be found that the pubes were distant from each other at least three-quarters of an inch." Besides, he tells us, "if a line be drawn (so as to retain any curves in which it may be bent) from the promontory of the sacrum along the linea innominata of the iliac bone, and the linea pectinea of the pubic, to the symphysis pubis of the apparently normal side, this line will be found, behind less, and before more, curved than in a pelvis of healthy or natural formation."

In none of the cases described by Naegelè had he been able to discover satisfactory evidence of tubercular or articular disease; the condition had never been diagnosed during life.

and—in time of parturition—always proved fatal to both mother and child. It has been one of the many triumphs of the Dublin School of Obstetric Surgery that the first successful diagnosis during life was made in the Rotunda Hospital by the late Professor Sinclair. It must, however, be added that the diagnostic victory did not in his case save the life of either mother or child. In the course of his remarks on the pathological pelvis so obtained, Dr. Sinclair observes that it "illustrates in a remarkable manner the observation of Naegelè," which will also, I think, receive further confirmation from examination of the present specimen. The observation is this:—"That all these pelves (apart from the differences which result from the *degree* of deformity, or from the *side* or *seat* of ankylosis) present, upon the relations of all their essential characteristics, a resemblance as perfect as that which exists between two eggs."

Naegelè's pelvis is but rarely met with; and the complication which in this instance co-exists—that of ankylosis of the hip-joint on the same side—makes the specimen still more remarkable. Before deciding on publishing an account of its peculiarities I submitted it to the criticism of the President of the Royal Academy of Medicine, the highest authority on osteal pathology that I know of, and his announcement, that he had *never seen* a similar specimen, will, I trust, be considered sufficient apology for my bringing it under the notice of the Pathological Section.

COMPLETE OSSEOUS UNION AFTER TRANSVERSE FRACTURE OF THE PATELLA.

By JOHN KNOTT, M.A., M.D. (Univ. Dub.); M.R.C.P.I., M.R.I.A., &c., &c.

[Read in the Section of Pathology, February 25, 1898.]

The rarity of a specimen of osseous union in a case of transverse fracture of the patella was well indicated by the great French surgeon, who so thoroughly disbelieved in its occurrence, or so extravagantly appreciated its value, that he offered its weight in gold to anyone who would procure him such a specimen. As the present specimen is in excellent condition, and shows the line of fracture with ideal distinctness, I thought that it might be worthy a few moments' attention from the members of the Pathological Section of the Royal Academy of Medicine. I possess no previous history of the specimen.

Dr. E. H. Bennett said that the specimen was as complete as any he had seen; it corresponded very closely indeed with the magazine plates in which there is a specimen almost identical with Dr. Knott's.

Mr. Myles, on examining the specimen, questioned whether the line of fracture along the cartilages represented a complete cleft through the entire thickening of the bone, whether it was not only a chip out of part of the bone.

Sir William Stokes thought that there was a distinct mark of the fracture in the front of Dr. Knott's specimen.

Mr. Wheeler said he had shown a specimen of bony union of the patella a good many years ago, at the Pathological Section in T.C.D. The specimen was obtained two years after the sustained injury, when death occurred from phthisis.

Dr. E. H. Bennett said that he had seen Mr. Wheeler's specimen. His specimen was one of comminuted fracture of the patella, the bone being broken into three pieces, and not a transverse fracture; such specimens were common.

THE CAUSE OF SENILE HYPERTROPHY OF THE PROSTATE.

By R. F. TOBIN, M.R.C.P.I., F.R.C.S.;

Surgeon to St. Vincent's Hospital.

[Read in the Section of Pathology, February 25, 1898.]

I SHALL preface my paper by reading notes of a case recently exhibited by me to the Surgical Section of this Academy.

CASE.—A. B., aged fifty-five, widower for eight years, father of eight children, suffered from urinary troubles for three years. They began by his being unable to micturate after a long railway journey. Had had repeated attacks of retention, and was troubled with nocturnal erections and other symptoms usual in enlarged prostate. Was admitted in May, 1896, into St. Vincent's Hospital. There was complete retention, and it was necessary to draw off his water with a catheter three times daily. This condition had existed for some weeks before his admission to hospital. An examination per rectum showed that the enlargement of the prostate engaged the middle lobe. Six weeks' treatment failed to give any relief. He was a nervous man who, notwithstanding the urgency of his condition, could not be taught to pass a catheter for himself. Operative interference was therefore necessary. In June, 1896, I removed between ligatures about half-an-inch of the vas deferens on each side. The operation was painlessly performed with the help of cocaine. A few days after the operation he began to pass a little water, the quantity increased daily, and at the end of a month he was able to empty his bladder satisfactorily. Coincident with this change the prostate, which was never very large, gradually diminished in size. He was discharged on July 10th. Since that date he has reported himself every two months for inspection.

Notwithstanding that he does not lead a temperate life, he has had no return of urinary trouble of any kind. To-day, twenty months after the vasectomy, this is his condition:—He describes his urinary system as working well, and his sexual

functions and desires as quiescent. A digital examination per rectum shows the prostate to be of normal size. A catheter passed immediately after micturition finds barely half an ounce of urine in the bladder. The testicles are, as far as one can judge, normal. Testicular feeling is present. On each side, but in a more marked degree on the left, the vas deferens is swollen, immediately below the site of the resection into what might be described as a retention cyst. *Fluid drawn from the cysts is found crowded with active spermatozoa.*

I call attention to this case on account of the light it throws on the pathology of chronic enlargement of the prostate. Let me recapitulate the facts. The patient was suffering for three years from irritation of the sexual functions and enlargement of the prostate, and these disturbances disappeared on the performance of an operation which caused no change except a checking of the flow of semen through the vasa deferentia. There are other cases of a like nature published by Mr. Harrison, Mr. White, and others. It is true that Mr. Harrison attributes the cure in his cases to atrophy of the testicles induced by the obliteration of their ducts, but it is a question whether the improvement did not begin too soon after the operation to be so accounted for.

Let me also lay before you the following information. For many years I have inquired from every patient who has consulted me, whether in hospital or private practice, for enlargement of the prostate as to his condition precedent to, and at the outset of, the disturbance, and from three-fourths of such as could give me any information on the subject I learned that a marked feature of it was failure or difficulty of emission during coitus.

So much agreement has there been on this point that I am convinced that any one who prosecutes similar inquiries among his patients will be struck by the weight of evidence on this point.

Taking, then, into consideration, in connection with

hypertrophy of the prostate (1) the marked disturbance of the sexual functions that exists in nearly all cases; (2) the difficulty of seminal emission, which I believe you will find to have been from the first a feature of these disturbances; (3) the effects of ligature of the vasa deferentia on the condition—I venture to submit that the starting point of the disorder in many cases will be found in conditions interfering with escape of the seminal fluid, leading to a chronic fulness of the seminal vessels—residual semen in a word—and so to excitement and undue vascularity of the prostate. The vasa deferentia, just before they enter the prostate, become enlarged and sacculated, and it will be generally allowed that a fulness of these vessels at this locality predisposes to excitement of the sexual organs. How slight an irritant may cause a disturbance of the sexual apparatus we have an instance of in the priapism resulting from smegma preputii in young uncircumcised children.

The changes I have in my mind when I speak of conditions interfering with the outflow of the seminal fluid are: (1) senile degenerations of the ejaculatory apparatus; (2) neurotic derangements of the same; (3) obstruction of the ducts due to pressure from without, chiefly congestions the result of sedentary habits, and of the recognised liability of the prostatic veins to become varicose and to contain phlebolites; (4) obstruction due to stricture of the ducts in patients who had been subjects of gonorrhœa. It would, of course, be most desirable with a view to establish my hypothesis that I should give anatomical demonstrations of the existence, at the outset of prostatic hypertrophy, of some at least of the above-mentioned conditions; but such a demonstration is evidently beset with very great difficulties. First, the difficulty of getting subjects; secondly, that of proving the initial character of any abnormality. I am therefore compelled to fall back on less direct evidence—viz., the fact that such conditions are pointed to by clinical observation

of the early progress of cases, and by their behaviour after vasectomy and after double castration. A slow change in the hypertrophied prostate follows vasectomy, because although the initial cause of the disturbance is removed the testicles, through the nervous system, continue to exert some influences; a quick change on the other hand follows double castration, because there is a complete severance of the ties between testicles and prostate.

The following occur to me as the points most likely to be urged against the theory under consideration:—

1. The unlikelihood of the irritation I refer to causing hypertrophy. This objection, it seems to me, had force until it was proved how completely the prostate is dependent on the testicle for its existence. If the prostate, whether hypertrophied or normal, withers when the testicle is removed, is it not natural to suppose that it will increase in size when it gains from the testicle abnormal stimulation?

2. The irregularity found not only in the shape, but in the constituents of the hypertrophy. To answer this objection I would point to the irregularities that follow obstructions in the urinary passages—viz., sometimes great hypertrophy of the muscular tissue of the bladder, other times muscular tissue replaced altogether by fibrous. The behaviour of the prostate must in a measure depend on the degree of obstruction and whether it specially engages one lobe. To explain myself I shall imagine a case in which the duct of one lobe was obstructed by old inflammatory trouble, in which this lobe became enlarged in consequence, and then by pressure on the common duct set going a general process.

3. The late occurrence of the prostatic hypertrophy is not explained by the hypothesis. In reply I say that most of the conditions that I suggest as interfering with the escape of semen are of late development, and also that as the growth of the hypertrophied prostate is exceedingly slow, and as it is of considerable size before it makes itself felt, the initial

cause of the disturbance may date very far back indeed. Patients have told me that it was their belief that the disturbance that culminated in a stoppage of water at or about fifty-five had affected them in one way or another for ten or fifteen years.

With these remarks, gentlemen, I leave this subject in your hands. I know its complexity, and therefore I submit my views with diffidence, not unmixed, however, with hope that your discussion of them will throw light upon a subject much in need of illumination.

Dr. Knott asked Mr. Tobin if he believed that double castration was a cure for senile enlargement of the prostate. Reports were very contradictory.

Dr. E. H. Bennett said that ligature of the vas deferens was different from castration, as the nerves, &c., supplied to the testis remained. If castration was to affect the nutrition of the prostate it must do so simply by shutting off the stream passing through the prostate, and not by any reflex action. He thought it a misnomer to call the operation of ligature of the vas deferens castration.

Dr. E. J. McWeeney said that the impression he was under about the influence of castration on producing diminution of the size of the enlarged prostate was that there was some kind of internal secretion poured into the general circulation by the testicle, and the existence of which was necessary for the well-being and full development of the prostate, and that when this was cut off the prostate underwent atrophy. The difficulty that he saw in the very interesting hypothesis put forward by Mr. Tobin was that he failed to understand what would be the cause of obstruction in the emission of semen in the patients he mentioned.

Mr. Tobin, replying to Dr. Bennett, said he had not intended to convey that ligature of the vas deferens was the same thing as castration. He believed that castration was followed by very much more rapid collapse and atrophy of the prostate than ligature of the vas. He wished to point out that some excitement of the prostate that he supposed to be a cause of its increased growth comes from the vas deferens, and he supported that point by the case related. As to Dr. McWeeney's remarks about obstruc-

tion, the proof, of course, was difficult. With regard to the view that atrophy of prostate following double castration was due to the cutting off of some secretion which entered the blood, that he believed was hypothetical, and there were some experiments which went against that theory. White, of Philadelphia, had proved that unilateral castration is followed by atrophy of the prostate on that side only. It was, of course, an exceedingly difficult question to solve.

LACERATION OF THE DUODENUM, THE RESULT OF A KICK FROM A HORSE.

By E. H. BENNETT, M.D., F.R.C.S.;

President of the Royal Academy of Medicine in Ireland;
Surgeon to Sir P. Dun's Hospital;
Professor of Surgery, Trinity College.

[Read in the Section of Pathology, February 25, 1898.]

CASE.—L. F., a man aged thirty, was admitted on the evening of November 24th, 1897, to Sir Patrick Dun's Hospital, having been kicked in the abdomen by a horse. One hoof struck him above and to the right of the umbilicus, the other a little above the crista ilii on the right side. He vomited a considerable amount on his way to the hospital and after his admission; the matter vomited was green in colour, and very fluid. There was no mark of any kind on the skin of the abdomen. On admission his temperature was 96·7°; next morning it rose to 100·5°, and remained at that point during the day.

I saw this man first at visiting hour on the morning after his admission, and was struck by his drawn and pinched look, and by the fact that although his lip was fairly red his pulse was imperceptible at the wrist. He was in great pain, vaguely seated in the back; he had had no motion since his admission, but he passed water which was normal, without blood or albumen. His abdomen was moderately distended and was very hard, but on percussion I could readily map out the contour of the liver and spleen, and the line of the colon and stomach. I came to the conclusion that there was no intra-abdominal hæmorrhage, nor, as far as I could diagnose, rupture of any of the hollow viscera. His condition was such that I thought at the time operation was inadmissible. In the afternoon the reaction was more established, and with the help of my colleague, Dr. Taylor, I opened the abdomen above the umbilicus in the middle line. I found neither blood nor any intestinal contents; there was a little rent in the great omentum, and here I tied a little vein which I think bled only on being relieved from the intra-abdominal pressure. I passed my finger over the

anterior surface of the liver, and found no blood nor any rent of its tissue. Displacing the omentum we got a view of the peritoneum of the posterior wall, and found nothing except that we noticed that its colour was abnormal—slightly yellow. I then closed the wound in the abdominal wall. The man died after midnight on the morning of 26th.

The *post-mortem* examination revealed the fact that the duodenum, where it lies against the spine behind the peritoneum, was ruptured, a rent measuring two inches in circumference at right angles to the axis of the intestine existed, and the intestinal contents had passed down along the spine and had reached into the pelvis.

I find that this injury is not uncommon, and that it is probably the most fatal of intestinal lesions; its clinical symptoms are very vague, and up to the present time but one recovery has followed the operation of suture out of a series of cases where the lesion has been proved to exist numbering 242. Since I wrote this in readiness for the last meeting of the Section, I have come across the account of a second recovery after suture of an intra-peritoneal rupture and the occurrence of peritonitis.

Dr. E. J. McWeeney said that he remembered seeing in the *post-mortem* room a case of traumatic rupture of duodenum, following a chronic, round, clean punched-out duodenal ulcer. In that case the patient had succumbed to an injury—the kick of a horse in the stomach. Immediate collapse followed the injury. Diagnosis of a rupture of some important abdominal viscus was made, but patient was too far gone to allow of operation. The rupture was into the peritoneal cavity, and was attended by acute, diffuse, purulent peritonitis.

Dr. E. H. Bennett, replying, drew attention to the statement of Colin, to whose facts he (Dr. Bennett) had alluded, that the clinical symptoms of such injury are very vague, and of such injuries recorded, only one recovery followed. A second recovery occurred recently in Buda-Pesth, where the abdomen was opened, after the occurrence of peritonitis, three or four days after injury, the abdominal cavity drained, and the wound sutured.

CANCER OF ŒSOPHAGUS WITH SECONDARY GROWTHS PERFORATING THE TRACHEA AND THE RIGHT SUBCLAVIAN ARTERY.

By JOHN W. MOORE, M.D., B.A. (Univ. Dubl.); F.R.C.P.I.;
Fellow of the Royal Medical and Chirurgical Society;
Senior Physician to the Meath Hospital.

[Read in the Section of Pathology, March 25, 1898.]

Questions of diagnosis are always of interest—never more so than when the seat of disease is one of the great cavities—the skull, the thorax, or the abdomen. In the case I am about to record, a cancerous growth caused pressure symptoms within the thorax so closely resembling those of aneurysm of the terminal portion of the arch of the aorta as to lead me to a wrong diagnosis of that lesion. Sudden death by profuse hæmorrhage seemed to confirm the diagnosis, which was entirely overthrown by the *post-mortem* examination. The case is as follows:—

Clinical History.—James C., aged fifty-six years, by trade a corkcutter, was admitted to the Meath Hospital on Monday, the 4th of October, 1897. The following are the notes of the case taken by Mr. Mervyn Falkiner, my clinical clerk at the time:—

"About six months previously the patient, on getting up one morning, noticed that he was hoarse. He could offer no explanation of this symptom. His appetite began to fail, and he had a considerable amount of difficulty in swallowing. About three months afterwards he got a cough and spit, which he compared to the yolk of an egg. This was sometimes mixed with a little *red* blood. During all this time his dysphagia increased, till, at the time at which these notes were taken, he was unable to swallow solid food at all, and took a long time to drink a cupful of fluid. Last week he came to hospital as an extern patient, and had a bougie passed down his œsophagus, which relieved him greatly.

"October 8th.—Sonorous rhonchi and sub-crepitant râles are heard at the left base, with puerile breathing. There are no signs on inspection, palpation, or percussion. The expectoration is now more abundant, and contains a larger quantity of blood. Circulatory system is apparently normal.

"October 30th.—The sputum is now fœtid, and there is a horrible smell from the breath. Some small pieces of lung tissue have been found in the sputum. Apparently a localised gangrene is present. Eyes—the pupils differ in size; the right pupil is small, the left is large. This sign has been constant. There is laryngeal stridor; it occurs with inspiration. The left pulse is smaller than the right. Dr. Lane Joynt examined the case with a laryngoscope, and found the left vocal cord paralysed. He also took a skiagram, which was one of the best I ever saw; but it does not show any definite sign of a tumour."

The following notes of the case from Nov. 1st, 1897, were taken by my clinical clerk, the late Mr. Valentine Walker:—

"The patient's appearance gives no indication as to the nature of his complaint, his face being full and well nourished, his complexion, however, is pale and pasty, and rather suggestive of renal trouble. The most noticeable thing about him is the stridulous breathing; it is not, however, very marked except on exertion; he speaks in a hoarse whisper, but his articulation is distinct; he has difficulty in swallowing, but can manage a little solid food; his appetite is fair. On inspection of his chest nothing particular is seen; it is perhaps a little enlarged in the upper half, suggesting emphysema; on palpation nothing is apparent. On percussion no localised area of dulness can be made out. On auscultation rhonchi are heard and puerile breathing, especially over the left lung. The heart sounds are normal and are not conducted abnormally.

"The left pulse is said to be smaller than the right, but this is doubtful. I examined for laryngeal tugging but it was not present. He was given creasote every fourth hour. This has relieved the breathing and reduced expectoration, and the breath is no longer fœtid.

"His diet consists of milk, two egg-flips, chicken or mutton, and 4 ozs. of whisky.

"He left the hospital and went home on November 22nd, 1897, but was re-admitted on December 4th at his own urgent request. He had never left his bed since leaving the hospital, and looked a good deal worse, though he did not seem to have lost much flesh. The breathing was difficult and stridulous, and his voice was very hoarse; loud rhonchi and coarse râles were present, and expectoration was fairly abundant, and it was sometimes tinged with blood. Swallowing is more difficult and the appetite is worse. Double meiosis is present. The breath is fœtid. He was again put on creasote and turpentine capsules; this improved the breath and the fœtor diminished.

"About the 10th of December he lost all appetite for food. He could give no reason for this; he did not feel sick, but food that he tried to swallow always came up again after a few minutes. This loss of appetite was the only symptom that distressed him. All this time he never complained of any pain. The only thing he took from this time till his death was whisky.

"He complained of a 'draw' in his breathing, as he described it."

Mr. Walker adds:—

"I saw him last alive on Wednesday, the 22nd, on my night round; he was asleep and looked as usual. I had not noticed any particular change in him. He was sitting in a chair at the fire on Tuesday night.

"He died on Thursday morning at five o'clock from profuse hæmorrhage."

The following notes of the autopsy were taken by Mr. Walker:—

"*Post mortem*.—The body was not wasted, but looked well nourished; there was no external evidence of a tumour. On making the usual incision there was a large amount of adipose tissue. The sixth costal cartilage on both sides was ossified, the others were not. When the thorax was opened, the right lung was seen to stretch right across the middle line, and was emphysematous-looking; it did not collapse. The pericardium was not visible, and only a small part of the upper lobe of the left lung, which was full of blood and deep red in colour, came into sight. When separating the right lung slight recent adhesions were met with; having removed it, the heart was found to be unusually small and contracted.

"A tumour could now be felt blocking up the inlet of the thorax; it was hard and nodular. To remove this the first rib and right clavicle had to be cut through. I then removed the larynx, trachea, œsophagus, heart and great vessels, and the left lung *en masse*. The tumour was found to be situated round the innominate artery, and in the posterior wall of the trachea the œsophagus was adherent and somewhat constricted, but not perforated. Another tumour was felt in the œsophagus about an inch above the diaphragm; the finger could not be passed through here.

"The left lung was firmly adherent, especially to the diaphragm, and was greatly congested. On opening up the trachea about an inch below the larynx, and on the posterior wall, a large perforation was found with irregular necrosed walls and surrounded by a cancerous growth. This growth surrounded the innominate artery and the origin of the right carotid and subclavian arteries. On opening these a number of small perforations were found which opened into the hollow of the cancerous ulcer. These were situated in the right subclavian artery, just beyond its origin. The tumour on the lower end of the œsophagus was hard and nodular, and had constricted it greatly. The upper tumour occupied the thoracic inlet so fully that the first finger could not be forced up under the sternum."

I am indebted to Professor A. C. O'Sullivan, Fellow of Trinity College, Dublin, for the following note of the macroscopic and microscopic appearances in the case:—

"A tumour was found in the œsophagus commencing an inch below the level of the bifurcation of the trachea, extending downwards for 2 inches, and $\frac{3}{4}$ in. thick in its thickest part. It passed round the posterior and lateral walls, leaving a strip $\frac{1}{2}$ in. wide free on the anterior wall. It was deeply ulcerated in the middle, and a superficial ulceration extended from it downwards, ending sharply by an irregular line which divided it from the normal epithelium.

"Along the left side of the œsophagus was a chain of lymph glands, hard, enlarged, and evidently infected by the tumour. They had been cut away at the level of the bifurcation, and could not be traced further.

"On the right side, commencing about an inch above the

bifurcation and extending to the level of the cricoid cartilage, was a second tumour-mass 3 in. long, and about 1½ in. in cross diameter, nodular and hard, which was partly composed of infiltrated lymph glands, but also involved the lower part of the thyroid gland. This mass surrounded the right and posterior walls of the trachea, passing between it and the œsophagus. It also surrounded the innominate artery and the origins of the right subclavian and common carotid, except in front. The large veins passed free in front of it, and the vagus nerve passed through the mass, showing a bulbous swelling just before entering it.

"The œsophagus was closely connected with the mass, but not involved in the growth. It was puckered-in in one spot, and had two small superficial ulcers near that spot.

"In the posterior wall of the trachea there was a large hole, ¾ in. by ¾ in., the floor of which was formed by the tumour.

"On the right wall, close to this, was another smaller perforation, which was filled with blood-clot and communicated with a perforation at the origin of the right subclavian artery. This perforation, also filled with clot, was ½ in. by ¼ in.

"Round these perforations the mucous membrane of the trachea was irregularly swollen and ulcerated, and this condition extended for some distance upwards and downwards. Microscopic examination showed both growths to be squamous cancer.

"From these appearances it is most natural to conclude that the lower tumour was the primary one; that the lymphatic glands were secondarily infected through the lymphatic vessels; and that the growth passed over into the thyroid gland by direct continuity with the infected lymphatic glands."

Remarks.—I am free to admit that the result of the *post-mortem* examination in this case greatly surprised me. The absence of anything resembling cancerous cachexia or of any constitutional disturbance, and the presence of a whole group of pressure symptoms, led me to the belief that the lesion was most likely an aneurysm of the terminal portion of the arch of the aorta pressing backwards and to the left. The laryngeal stridor with paralysis of the left vocal cord pointed to pressure on the recurrent laryngeal nerve; the dysphagia,

to pressure on the œsophagus; the bronchial catarrh and dyspnœa, to pressure on the left bronchus; the recurrent appearance of fœtid breath and expectoration, to pressure on the nutrient vessels of the left lung.

It is true that the physical signs of thoracic aneurysm were wanting. There was no marked area of dulness on percussion, or fulness, or tumour, or area of pulsation, excentric and distensile in character; or localised area, in which sounds resembling those of the heart were audible. But "it has been aptly said that aneurysms of the ascending aorta were those of physical signs, while aneurysms of the transverse arch were those of symptoms" (Horace Parsons).[a] Dr. Stokes, also, in his masterly Treatise on Diseases of the Heart and Aorta,[b] makes the following pertinent observations:—

"As the two most common forms of intra-thoracic tumour are those of aneurysm and of cancer, and as all the symptoms of excentric pressure are more or less common to the two diseases, the rule is easily derivable that an intra-thoracic tumour having been discovered, the diagnosis will be between aneurysm and cancer. As the first of these affections, however, is so much more frequent than the second, the chances will be greatly that in any given case of intra-thoracic tumour the disease is aneurysmal.

"But I have already shown that a cancerous tumour may not only produce all the symptoms which we observe in aneurysm as proceeding from compression of surrounding organs, but that it may exhibit a diastolic pulsation, accompanied by a distinct bellows murmur. As might be expected from the rarity of the disease, our experience of those cancers which simulate aneurysm is as yet but limited. I am aware, however, of two cases of cancerous tumour—the one presenting only the signs of surrounding pressure, without pulsation or murmur; the second having the latter signs, in addition to those of pressure on surrounding parts."

[a] Medical Record, New York, Feb. 19, 1898. Page 267.
[b] Dublin: Hodges & Smith. 1854. Page 603.

Dr. Craig said that the case was an extremely interesting one. A somewhat similar case came under his care in the past fortnight, where the primary cancer occurred in the œsophagus just below bifurcation of trachea, the secondary growths occurring in many places. A large growth occupied the lesser omentum, extending from the posterior wall of the lesser curvature of stomach to the under surface of liver; a lower growth surrounded the aorta, and was adherent to the vertebral column. There were small growths in liver, lungs completely studded with small tumours, and epiglottis also involved; and, although vocal chords and larynx were not involved, there was behind and on edges of epiglottis a new growth—a squamous epithelioma. In his experience of such cases, in nearly all of them the growth involved that part of œsophagus which lies opposite the bifurcation of trachea.

Dr. M'Causland asked if a bougie had been passed more than once? Was any blood or matter noticed on withdrawal of bougie? Was any obstruction noticed? Was the vomited matter ever examined microscopically, and would such examination throw any light on the diagnosis? Was any reason assigned for the fœtid expectoration? His experience was that cancer in the lung gave rise to very fœtid expectoration and marked symptoms.

Dr. E. J. McWeeney agreed with Dr. Craig in saying that the favourite place for cancer of the œsophagus is about bifurcation of trachea. Last week he made a *post-mortem* in a case of cancer of the œsophagus corresponding to bifurcation of the trachea. The left bronchus was adherent to the thickened portion of the œsophagus, and although the œsophagus itself was ulcerated and thickened, there was not the slightest attempt at ulceration of the bronchus, and although there was a big packet of lymphatic glands wedged in between the structures in this situation, careful examination revealed not the slightest evidence of cancerous deposition in any one of them. They were all black, and appeared to be infiltrated with carbonaceous pigment from the lungs. It was thus interesting to note how completely limited cancer may be to the mucous membrane of the œsophagus itself without spreading to such eminently attackable structures by epithelioma as the nearest lymphatic glands.

Dr. Knott had seen Dr. Moore's case, and could confirm his difficulty about the diagnosis. About a hundred years ago, when disease of œsophagus was rare, the upper third of œsophagus was laid down by all authorities to be the most favourite seat for

cancer which was scirrhus. Later German statistics showed that the common seat was at the lower end, and was always epithelioma. He asked Dr. Moore what was his experience of secondary growth as limited to œsophagus. He had heard it laid down by some authorities that fœtid expectoration is never characteristic of cancer of the lung.

Dr. Moore, in reply, said that the bougie had been passed only once before the case came under his observation, and the passage of the bougie produced a remarkable amelioration in the symptom of dysphagia. However, he forbade further attempts to pass it, as he came to the conclusion that a thoracic aneurysm was present. With regard to the expectoration, he concluded that that was another evidence of intrathoracic aneurysm, that the pressure was exercised on the nutrient vessels of left lung in which there were distinct physical signs. In answer to Dr. Knott he said that there was no evidence of involvement of the lung in the cancerous growth at all. He added that the mode of death seemed to him to confirm the diagnosis of aneurysm, which was first called in question by the X-rays examination, which revealed no aneurysmal tumour.

TREPHINING FOR DEPRESSED AND COMMINUTED FRACTURE OF THE SKULL; PATIENT AND PORTION OF BONE REMOVED EXHIBITED.

By W. I. de C. WHEELER, M.D., F.R.C.S.;
Surgeon to the City of Dublin Hospital.

[Read in the Section of Pathology, March 25, 1898.]

C. M., aged twenty-nine, occupation a coachman, was admitted into the City of Dublin Hospital on the 21st March, 1897, having sustained a severe injury to his head, caused by a fall from the top of an electric tramcar while in motion. The patient's condition on admission was that of profound coma, he was completely paralysed, and his respirations were stertorous, his pulse was laboured and slow, 50 per minute; the surface of his body was warm and perspiring; both his pupils were dilated, his reflexes were absent; his fæces and urine were retained; there was no hæmorrhage from his ear, mouth, or nose. A large depression could be easily detected upon the left side of his head, in front of the parietal eminence.

A large V-shaped flap was raised, the hair having been previously removed and the soft parts thoroughly cleansed. This exposed the depressed area of bone, which was at the junction of the parietal and sagittal sutures, and there was brought into view an extensive comminuted fracture invading both frontal and parietal bones. A large triangular piece of bone was removed, and two smaller pieces with several spicula. From the superior portion of this large triangular piece of bone the superior longitudinal sinus had to be separated. There was considerable hæmorrhage from a large cerebral vessel as well as from wounds in the dura mater. Ten minutes after the operation the patient conversed with his master, a Doctor of Medicine living in Merrion-square. It is not necessary to detail the daily progress of this patient, who has quite recovered, except for the loss of sight in his left eye.

After the operation, and for days after, he could see tolerably well with his left eye; his field of vision was impaired, and occasionally there was a "blur," to use his own phraseology, over

and round objects he looked at. During this period there could not be ascertained by transmitted light anything abnormal with the fundus or with his optic disc, yet his pupil contracted when his eye was closed and dilated widely when his eye was opened, or when he opened it himself by request. There was no ptosis. There was not any inequality in his pupils previous to the dilatation of his left pupil observed on exposure to light. There was not any sluggish reaction of the right pupil on a strong beam of light being thrown into his left eye. There was not any contraction followed by dilatation, or oscillations of any kind; his pupil remained dilated. The so-called paradoxical pupil is diagnostic of early paralysis, and, as described by writers on this subject, consists in this—that when a strong beam of light is thrown into the eye with the focal illumination, the pupil at first contracts fairly well, then dilates slightly, contracts again, and after a few such oscillations finally dilates widely, although the strong light still shines into the eye. There is no paralysis in this case.

TRAUMATIC RUPTURE OF THE LIVER AND KIDNEY.

By W. I. de C. WHEELER, M.D., F.R.C.S.;
Surgeon to the City of Dublin Hospital.

[Read in the Section of Pathology, March 25, 1898.]

The subject of the above injuries was a child, aged six years, who was run over by a cart, causing rupture of the liver and right kidney, both shown. The child was admitted to the City of Dublin Hospital on March 10th, 1898, at 3 30 p.m., apparently with little the matter, as it ran about the accident ward. There was no external mark. At 4 15, the child, lying in its bed, was observed to get weak, and shortly after exhibited all the signs of collapse; three hours after it died.

The liver presented a contused appearance. On the upper surface and posterior portion of the right lobe, towards the anterior right margin, was a linear rupture, with the capsule torn about $\frac{3}{4}$ of an inch. Between this and right border, near the right lateral ligament, there was an angular gaping rupture, $2\frac{1}{2}$ to 3 inches long, communicating about the centre with the posterior surface and extending round the right margin. Upon the under surface of the right lobe, corresponding to the depression for the kidney, was a long irregular rupture, gaping slightly and extending at one portion into the rupture on the superior surface.

The right kidney presented upon the anterior surface three long, gaping ruptures, two of which passed round its inner border and extended posteriorly, the third extended to the outer border and deeply into the kidney substance. Upon the posterior surface, as well as the two ruptures mentioned, there were about its centre several minute ruptures which were covered by the unbroken capsule. The child passed urine on admission; there was no blood passed with the urine. Although the *post-mortem* examination revealed a large blood-clot in the urinary bladder, there was a large quantity of blood in the peritoneum. The vessels of the kidney were not injured.

This child called to the mind of the writer two other cases—that of a man who received a kick in the abdomen and who was in a collapsed state, in whom, when reaction was established, a large vessel was ligatured in the abdominal cavity, probably a branch of the cœliac axis; he made a good recovery. The second was an example of what has been termed "wind contusion," where a six-pounder ball passed across a man's abdomen. This man walked for a mile or more after the accident. There was no abrasion of the skin; his liver, spleen, and kidneys were ruptured.

Mr. T. Myles said that Mr. Wheeler's second case showed the great obscurity of the symptoms. It was astonishing to note the extraordinary amount of liver shattering that may exist, and be for a time unaccompanied with any severe symptoms. He related the case of a man who got squeezed between buffers on the railway, but had sufficient strength to walk a considerable distance before feeling weak. He was then driven to hospital and put to bed. Soon afterwards he developed some collapse and slight tenderness, and stated that it hurt him to draw a deep breath. Three days afterwards, in a moment of anger—he was sitting up in bed at the time—he snatched up a pillow and threw it, and immediately gave a violent yell, lay back, and was dead in half an hour. *Post-mortem* showed the whole abdominal cavity full of blood, three vertical fissures in liver, one extending half way through its substance. Two of them had absolutely united, but the third had apparently been torn open by the sudden muscular effort. He related a remarkable case where a man sustained an abdominal injury, but was able to walk some distance to hospital, assisted by some friends. He vomited blood very freely, and became moderately collapsed. Death occurred in twenty-four hours. *Post-mortem* showed the small intestine cut clean across as if cut with a sharp knife, the cut extending for some inches through the mesentery. The right external iliac artery was torn, and a huge extravasation of blood surrounded it. His liver was turned into a regular jelly, and was utterly unrecognisable, and his fifth lumbar vertebra was dislocated half way back behind the fourth. Death was due to shock. It was probable, he said, that in the "wind contusion" death was

due to traumatic rupture of liver due to the gliding action of the cannon ball shattering and rupturing the liver, without any external mark of violence.

Dr. E. J. McWeeney said that about a fortnight ago he had made a *post-mortem* examination on a man with rupture of liver caused a fortnight previously. A cart-wheel had passed over thorax, and the right lung was ruptured, giving rise to a suppurating gangrenous cavity in its substance, and the liver below the diaphragm was ruptured in the most convex part of the right lobe for some inches into the depth of its substance. For several inches along the surface, corresponding to this rupture, the diaphragm had been detached from the liver, leaving a space filled with pus, blood, and bile. On washing away the stuff, the walls were of a brilliant yellow hue, due to bile staining, but the contents were of a brown colour, apparently due to blood and pus, as suppuration had taken place. Death was due to septic absorption. There was nothing whatever in the clinical symptoms to cause a surgeon to suspect rupture of the liver. All the interest was in connection with the lung.

SARCOMA OF THE SPHENOID BONE.

By W. I. de C. WHEELER, M.D., F.R.C.S.;

Surgeon to the City of Dublin Hospital.

[Read in the Section of Pathology, March 25, 1898.]

A male, aged twenty-five, from whom this sarcomatous tumour originating in the sphenoid bone was removed, was admitted into the City of Dublin Hospital, on October 18th, 1897. His previous history told, and his present condition demonstrated, that he had suffered from inflammation of his right middle ear, consequent upon which he had perforation of his tympanum, and some discharge; he had slight facial paralysis, accompanied with a "scalding" pain in the right side of the face; he had tenderness and pain over his right mastoid region; some rigidity of his masseter muscles; there was no vomiting, no unsteadiness of his gait; there was no eye trouble, nor did examination reveal anything abnormal in his eyes. Mr. Wheeler trephined this patient by his own operation, in December, 1897, opening the mastoid cells, the tympanum, and exposing the dura mater, at the upper arc of the trephine circle, which allowed the temporal lobe to be explored. The patient recovered rapidly and progressed to convalescence, feeling much relieved from the pain. The discharge ceased, and there was less contraction of his masseter muscles, the scalding pains in his right face were very much lessened, but the facial paralysis remained unaltered.

In February, 1898, the scalding feeling and pain again troubled him. His masseter muscles again became rigid and contracted, and he now complained of pain in the temporal region anterior and on a level with the superior margin of his ear. The history of his case told that he had received an injury in this situation by a brick falling upon his head, while he was following his occupation as a carpenter in an unfinished house. The possibility of a cerebellar

abscess was thought of, but there was not sufficient evidence to verify such a conclusion. There was nothing that could be found by ophthalmic examination to indicate tumour of the brain; his eyes were normal. He was trephined (by Mr. Wheeler) over the seat of his pain upon March 3rd, 1898. A careful examination was followed by a negative result; the man expressed himself much relieved from his pain, which had been acute; he lived until March 8th, and apparently died of pressure on the region of the medulla.

An examination was made, and a rounded nodular tumour was seen bulging into the middle fossa on the right side, extending into the sphenoidal fissure, and posteriorly to the petrous portion of the temporal bone for about 1½ inches, its superior surface being on a level with the anterior-clinoid process; continuing inwards it occupied the space between the anterior and the posterior clinoid process of the right side, extending beyond the middle line; posteriorly a nodule could be seen lying under the fifth nerve, and internally to this a large nodule encircling the sixth nerve as it passes the dura mater; the carotid arteries were surrounded by this growth, and the third nerve passed into it. The tumour was of vast extent, pressing into the ethmoid bone in front, and into the pterygoid regions on the right side, behind it involved the basilar process of the occipital bone and the occipito-atlantoid joints. The specimen was interesting, taking into consideration the absence of all eye trouble, notwithstanding that the third, fourth, fifth, and sixth nerves passed through the tumour. Two days before the operation of March 3rd this patient walked about the ward and sat in a chair for two hours.

Dr. E. J. McWeeney said he had made a microscopic examination on the tumour; the tumour consisted of sarcoma tissue, partly round and partly spindle-celled. There was rather a curious appearance, due to the presence in the tumour of bands of very tough, almost hyaline connective tissue, which cut up the sarcoma in places into alveolar-looking masses which almost suggested a cancer. The tumour was sarcomatous in nature. He thought, on the whole, that the strands were dura matral, tough and degenerate, and separated from each other by the cells of the tumour.

Mr. T. Myles asked if any of the physicians present could tell

him whether it is ever possible to make an accurate diagnosis of cerebral tumour. As to the surgical side the diagnosis is extremely difficult. He had a good while ago seen a case in Steevens' Hospital with obscure nervous symptoms. A great many medical men thought that the case coincided with Professor Charcot's description of disseminated sclerosis. *Post-mortem* examination soon afterwards disclosed a cerebellar tumour without any disseminated sclerosis.

ON ADENO-CARCINOMA OF THE MAMMA.

By W. I. de C. WHEELER, M.D., F.R.C.S.;
Surgeon to the City of Dublin Hospital.

[Read in the Section of Pathology, May 6, 1898.]

THE tumour was removed from a lady sixty-seven years of age. She was of a spare habit, and was suffering from uterine trouble, for which she was attended by Dr. Harley and Dr. Tweedy, who assisted at the operation. The wound healed kindly, and within ten days was completely healed and all dressings removed. The growth had been noticed a year prior to the operation.

DR. MCWEENEY, the Secretary (for Mr. Wheeler), described this specimen, and demonstrated the slides, which presented the typical microscopic appearances of this condition—a plexus of glandular tubules, most irregular in shape, occasionally filled up with epithelium, elsewhere cystic, and presenting small papillomatous ingrowths. In places the basement membrane had been broken through, and irregular masses of epithelium were lying free in the connective tissue. The cells were mostly high columnar, but in some groups were nearly cubical, and presented typical examples of the conditions described by Hansemann as anaplasia and hyper-chromatosis. To the naked eye the tumour resembled a lymphatic gland, being soft, white, egg-shaped, and distinctly encapsuled. The microscope showed that in one spot the tubular structure had broken through the capsule, and just begun to invade the adipose tissue outside.

DR. E. H. BENNETT said the case reminded him of one which occurred in his practice three years ago. The tumour in his case

was perfectly freely movable, non-adherent to skin or tissues of the gland. Both he and his colleague thought it benign. The lady, thirty-five years of age, was in the third month of pregnancy at the time, but as the tumour was growing rapidly, though still believed to be benign, he removed the tumour. It was encapsuled and shelled out quite easily. Perfect recovery in six days. Subsequent examination of tumour proved it to be a most malignant adenomatous carcinoma, rather a carcinoma than an adenoma. In less than two months the tumour recurred. There was no enlargement in the axilla, but it was clear that the tumour was of a similar character, and was adherent to the scar. He removed the breast and tumour, and glands in the neighbourhood, without meeting any infected tissue in the glands. The operation was severe, and was almost immediately followed by abortion. Recovery ensued, and at present there is no sign of recurrence. No doubt, the entire removal at first operation would have been the proper course. He thought that the doubtful cases, where the tumour is encapsuled, are about the hardest to diagnose in cases of disease of breast.

The SECRETARY, in reply, said that Dr. Bennett's case interested him much. The condition of an undoubtedly encapsuled tumour proving to be malignant is of considerable amount of clinical interest. He could not refrain from congratulating Mr. Wheeler on taking away the tumour "in the nick of time," as it would have spread immediately. So far as the sections prepared went, there seemed to be healthy tissue all round the cancerous portion, so he had the best hope that no recurrence would follow the operation.

SECTION OF STATE MEDICINE.

THE HOUSING OF THE POOR IN DUBLIN.

By HENRY C. TWEEDY, M.D. (Univ. Dubl.), F.R.C.P.I.;
Diplomate in State Medicine, University of Dublin;
Physician to Steevens' Hospital.

[Read in the Section of State Medicine, February 18, 1898.]

In welcoming you to the opening meeting for 1898 of the State Medicine Section of the Royal Academy of Medicine, it is my first and most grateful duty to offer to you my very warm thanks for the honour you have done me in appointing me your President, and to express a hope that during my term of office the Section may continue to show the same abundant signs of vitality that have characterised its meetings during the reign of my predecessors in this chair, and which you also see amply evidenced in the programme now set before you.

Not, indeed, that the President can claim any great credit for the exuberant vitality to which I have alluded. It is to another officer the meed of praise for this is justly due—an officer who, though he shines not with an ephemeral lustre from a Presidential chair, is yet the main source of light and vital energy to a Section—I allude to the Secretary; and it is with pride and pleasure that I would remind you, were it not superfluous to do so, that it is to the untiring exertions of Dr. Ninian Falkiner, and to the support he has received from his colleagues, that this success may be almost entirely attributed.

In this Royal Academy of Medicine the State Medicine Section exercises an important and unique function. While

in the other Sections the subjects under discussion must be dealt with from a strictly technical standpoint, this Section of ours has, in many respects, a still more peculiar and responsible *rôle* to play, in that it deals largely with questions having a wider scope than those which would claim merely the professional interest of the physician or the surgeon. Here we are brought more into touch with the needs of the community at large, and it has often seemed to me that it would be highly desirable—could certain manifest difficulties be got over—if, instead of merely embalming the results of our labours, and then entombing them in the mausoleum of the Transactions, there to lie till disinterred by some curious student of the antique, the meetings of this Section might be made more popular in their character, and that persons interested in questions affecting Public Health might be introduced to assist in our deliberations, and learn with those who have had special opportunities for studying such questions the blots that are to be found in our sanitary laws, and the means that might be suggested for removing them.

It is to the consideration of one of these blots that I would ask your assistance this evening—viz., the difficult, nay, almost insoluble, problem of the Housing of the Poor.

It was said by the greatest Philanthropist the world ever saw—"Ye have the poor always with you," and it is not probable that in Dublin, at all events, we are likely to forget this fact; nay, the very knowledge of it has created channels through which relief in various forms reaches the poor. Nowhere in the world, perhaps, are they better cared for in the way of hospitals and medical advice, and there are also numerous charitable organisations for supplying them with clothing, food, and fuel; but when we come to look at their homes it is then that the gaunt spectre of misery and discomfort faces us in all its hideousness.

Compare this state of things with the lot of the average

artisan, earning steady wages, and having constant employment; the conditions under which he lives contrast in every way favourably with those of his poorer neighbours.

The Dublin Artisans' Dwellings Co. and numerous other building societies have, of late years, supplied a great public want by constructing roomy, well-ventilated, healthy tenements, provided with every modern sanitary requisite, and with a weekly rental of from 4s. upwards; but there is a class—a very large class—who would find it utterly impossible to pay even the moderate rent of 4s. per week. On examining the census returns for Dublin in 1891, we find that out of a population of 349,394 there are under the classification of hawkers, porters, labourers, the large number of 83,472 persons, or about one-fourth of the entire population.

Let any reasonable person ask himself the question—how could a rent of even 4s. a week be paid out of the precarious earnings of such as these?

But what becomes of them? Where do they live?

Through the kindness of Sir Charles Cameron I can lay before you a few interesting figures which throw some light on this part of the subject.

He informs me that for the purpose of inspecting tenement houses the city is sub-divided into 16 districts, each district having a distinct officer.

That he had estimated that there were about 54,000 families in Dublin inhabiting 24,000 houses. But how were these distributed as regards numbers—16,000 houses out of the 24,000 were inhabited by 22,000 families, and the remaining 8,000 houses, containing about 48,000 rooms, were inhabited by 32,000 families, allowing only about one and a half rooms to each family.

This state of overcrowding is bad enough, but worse remains behind. Most of the houses used as tenement houses in Dublin are old, varying from 100 to 200 years. They were

formerly inhabited by the wealthier class, but have gradually fallen into decay more or less; and having been built at a time when sanitary science was not even thought of, are in many instances utterly unfit for human habitation.

Now, independently of the manifestly injurious effect produced upon the health of our poorer fellow-citizens by this mingled condition of squalor and overcrowding, the moral deterioration that accompanies it is even more to be deplored. The social reformer, preaching cleanliness and temperance, is here met with a practically insurmountable obstacle. What inducements have these wretched people to be clean or temperate? The first is rendered almost impossible by the nature of their environments, and if they seek in the glare of the publichouse some of the brightness they find not in their homes, and endeavour to dull their senses into a temporary oblivion of their wretchedness, is it for us to cast a stone at them? More especially when they are paying for all this squalor more in proportion than the wealthy inhabitants of the squares are paying for their luxurious homes. Anyone taking the trouble to walk through the slums of this city can verify these facts for himself. He will find countless instances of exorbitant rents being paid for rooms in many cases unfit to be habitations for swine, while the proprietors of these miserable tenements are reaping a rich harvest from the scanty earnings of these miserably poor people.

It is not for a merely idle purpose I venture to inflict upon you a thrice-told tale like this. No; we are face to face with a great social problem, which not only remains yet unsolved, but to solve which only too little effort has been made up to the present.

Even for the miserable accommodation of which we have been talking the demand is greater than the supply, and nothing remains but that last refuge, the workhouse, one

of the most glaringly demoralising institutions ever devised or made use of by a civilised community.

With the exception of the inmates of the union hospitals and the infirm wards—the two redeeming features of the system—here one may see crowds of fairly strong men and women doing nothing, or almost nothing. They cannot be employed at remunerative labour, as the cry of underselling would at once be raised, and there they drift along, in an unhealthy moral atmosphere, till they get tired of the place and go out to seek a precarious subsistance elsewhere, their places being rapidly filled by a never-failing stream of miserable successors.

It is astonishing to think how little has been done to remedy this crying evil.

The Corporation of Dublin have, no doubt, made some praiseworthy efforts in this direction. They have built a few tenements of the kind that are needed—that is to say, with rents from 2s. per week downwards, any higher rent than this being beyond the reach of the classes of which we are speaking. The Corporation have in all 83 tenements of this class, as I am informed by Sir Charles Cameron—46 at 2s. a week, 14 at 1s. 9d., and 23 at 1s. 6d.

They are also clearing away in various districts blocks which no doubt ought to come down, but it has been complained to me, over and over again, that the unfortunate people who are thus turned out of their homes, wretched though they were, have literally nowhere to go save to the workhouse.

With, doubtless, the best intentions in the world, the Corporation of Dublin have not a free hand in this matter. Dwellings of the description required, and containing tenements which could be let at rents varying from 2s. downwards, could not be constructed save at a loss, and the financial powers of the body are limited; also they have not suffi-

cient borrowing powers, and yet it would seem to be very clearly the duty of the municipality to provide accommodation of this type, as by doing so, when opportunity offered, the plethora in the unions might be relieved, and some much-needed economy effected in that direction, the results of which might go towards a building or improvement fund.

But, independently of constructing new blocks of buildings, there is another way in which suitable accommodation could be provided, and that at comparatively moderate cost.

The tide of fashion in Dublin, as in many large cities, has of late years flowed steadily in the direction of the suburbs, which one sees increasing daily in size and importance. In consequence of this exodus, there are numerous houses in streets formerly fashionable which might be purchased or rented at figures comparatively low. These, however, though antiquated in construction, are well and strongly built, and by suitable internal alterations could readily be modified into healthy and commodious tenements.

And now as regards the financial question may I offer one hint or suggestion in conclusion.

Is there any legitimate way in which the Corporation of Dublin could so increase its finances as to be able to effect these most desirable improvements, without imposing any additional burden on the ratepayers? I believe that there is, and that, too, without any sweeping legislative changes, but merely by using machinery already in existence, though allowed to rust from want of use.

I allude to the periodical revision of the valuation of house property, and, as a consequence, the insuring of a less glaring disproportion between the valuation and the rent than exists in many cases at present. This is neither the time nor the place for going into this subject in detail, but I will merely ask your forbearance while I offer you two illustrations.

In the principal business streets of Dublin there are numerous houses in which it is seen that the lower story is a shop and the upper stories are let as offices for which a high rent is usually paid; now if you look at the valuation of houses such as these, it will frequently be found that the gross rent paid for the house, including the shop and offices, is far in excess of the valuation.

Again, in the case of the tenement houses, of which we have just been speaking, here the discrepancy is even more remarkable, as in many cases the rent is four or five times the amount of the valuation, and even more.

Were the law then put into force which requires a periodical revision of the valuation of the entire city, and were that valuation caused to bear a fixed proportion to the rent in all cases, the financial result would be very startling; and I am convinced that in this way, without putting additional pressure upon anybody, the municipal revenues would be sufficiently augmented to admit of the carrying out a much-needed reform, and of raising, in the improved moral and social well-being of our poorer brethren, a lasting monument of the enterprise and philanthropy of our city.

The Royal Academy of Medicine is not an executive body, nor has it any power to carry out measures which it believes to be urgently required, but, as I said at first, this Section of State Medicine has a most important and peculiar function to discharge—namely, the moulding of public opinion and the guiding of public action in the direction of much-needed reforms; but its efforts are unduly cramped, its horizon is at present limited.

Many of us here are brought into daily contact with the poor, and have learned something of their wants, their needs, their difficulties, in the only way the lesson can be learned—viz., by personal contact with them.

Others, again, from the special nature of their studies, are

eminently qualified to advise and to direct, and to guide into proper channels philanthropic efforts otherwise liable to be wasted.

But it is of little avail for a small body of professional men to discuss *in camerâ*—for it amounts to that—reforms which they are powerless to carry out; and so it is that I venture to hope that the day may not be distant when the Royal Academy of Medicine may in its wisdom decide to open its portals wider, at least as far as the Section of State Medicine is concerned, and, by inviting the co-operation of those interested in public and social reforms, greatly to enlarge its sphere of usefulness, and render itself a still more important factor among the agencies which are at work for the relief of misery and suffering.

ON THE MORTALITY OF CHILDREN IN IRELAND (1886–1896).

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[Read in the Section of State Medicine, April 29, 1898.]

I have ventured to submit to you some calculations, which, though very few, are yet of great importance, and I hope of some interest, concerning the deaths of young children in Ireland. These may not, perhaps, afford much material for a lively argumentative discussion, but as an investigation conducted with considerable difficulty and very great care, I ask your kind attention for a few moments. Long columns of figures, death-rates, and percentages I have reduced to their smallest possible compass, and I have endeavoured to present to you, accurately, in a nut-shell the present state of child-life in this country.

For your convenience I have taken the liberty of handing you these figures, and I trust they appear in an intelligible form.

In Table I. you will see the deaths of young children under 1 year and under 5 years in the whole of Ireland and our four large cities, for 10 years ending 1896, along with the total births and deaths at all ages.

These are even better understood by a glance at Table II., which sets forth the rates per 1,000.

Observe that in the *City of Dublin* out of every 1,000 children born 171·2 die in their first year. This is the highest in Ireland. Look for a moment at *Belfast*. Here you will see a most astonishing fact—viz., that in every

1,000 total deaths no less than 519·8 (almost 520, and considerably over *one-half*) are children under 5 years of age. We are not quite so bad here in Dublin, although our rate is higher than it might be; but it is a reproach even to us that of our own total deaths more than one-third are children under five (306·2 per 1,000).

Thus far many investigators have gone before, and being accustomed to see such figures often quoted they may, perhaps, cause you no surprise.

I will, however, pass on to a more practical aspect of the subject, and ask you to come with me a step further, and let us investigate the causes of these deaths—viz., what classes of disease are most fatal to children in this country, and hence, perchance, we may at length approach the *fons et origo mali* (the sources of our high infantile mortality), a pursuit which is alike fraught with difficulty and interest.

In Table III. you will see set forth the *classes* of disease most fatal to children in Ireland under 1 year and under 5 years, for ten years ending 1896.

In this list I would draw your attention to the fact that of young children dying in Ireland an enormous number appear to be so *indifferently certified* that they cannot be properly registered and classified. It is a great pity that so many deaths are ill-defined. Observe, also, that these imperfections are almost entirely confined to children under one year. What does this mean? I take it to signify, amongst other things, that the younger the child is the greater is the difficulty of the diagnosis of its disease, and hence the greater likelihood of its being inaccurately recorded. Again it must be borne in mind that in a great number of these ill-defined cases there has been no medical attendance at all, and the children have been allowed to die uncertified.

Pursuing this a step further, Table IV. will, perhaps, bring it out more forcibly. It shows you the various *systems affected* or *orders* of disease most fatal to young children. They are placed in the order of their relative importance.

This is a very valuable and interesting table. Observe the high place occupied by *nervous diseases*, especially in young infants. There were 21,998 cases of nervous diseases under one year, while in the *next four years combined* there were only 6,830. This is most remarkable. Observe, also, how *respiratory* diseases chiefly kill the older children.

Equally striking is the frequency of *diarrhœal* diseases under one year. *Venereal* diseases are seen to act heavily on the younger children. Mark, also, the large number of *homicides* in infancy. There is an absence of *malarial* diseases.

The most useful Table of all is, however, the longest—Table V. It shows the actual registered diseases, and individual causes of death of all young children in Ireland for ten years, arranged in the order of relative morbidity.

Now what disease heads the list? A very indefinite and unsatisfactory diagnosis. I think you will grant that *debility, atrophy, and inanition* is somewhat too general a term for a medical certificate. True it is that some of these are uncertified, but by no means a large proportion. This opens a large field for investigation. It represents, I think, a certain lack of that precise accuracy in our diagnosis of the fatal diseases of children, which, however difficult it may be, yet we all should aim at. Most of the cases catalogued in former tables as "ill-defined and not specified" are here found entered as "debility"—a title truly indistinct.

A like observation holds good with regard to *convulsions*.

This, as you know, is not a true disease at all. It is merely a symptom—a most obscure one I grant you, but one which I think we should endeavour to fathom somewhat more deeply than, perhaps, we have been hitherto accustomed. Convulsions may be symptomatic of the most varied and diverse forms of disease, from the most trifling dyspeptic ailment on the one hand, to the most incurable gross structural disease on the other. To my mind, we might just as well register a death as due to *headache* as to say a child died of "convulsions." The diagnosis is difficult, but I believe we should try it, and not only so, but that we should educate our students to try it also. It is, at present, almost open to any outsider to say that the two chief causes of our infantile mortality in Ireland are diseases which are insufficiently recognised by our Profession.

There are many other points of interest in this Table—see No. 12 in the first list (No. 14 in the second). Now, *do children die from dentition?* I do not believe they do. We have all seen children die during the process of "teething," hundreds do, but if solely attributed to this cause I now believe the diagnosis to have been a more or less mistaken one. There are many accidents and accompaniments attending this period of "dentition" in children, just as there are at "puberty" and the "menopause," but as an actual cause of death it should not, I hold, be registered, as it has only a predisposing and remote connection with many of its contemporary troubles.

It is interesting to see where *suffocation* comes in our list; it ranks high in young children. Other diseases, to whose special position in infancy I would draw your attention, are—*syphilis* (No. 24); *diphtheria* (No. 35); and *enteric fever* (No. 48). This latter I am inclined to believe is rather exaggerated in frequency. *Chorea* (No. 126), so very prevalent in later childhood, scarcely affects

infants at all, and caused only one death in the whole of Ireland in ten years.

Turning now to the older children—viz., total under five years—observe *diphtheria* again (No. 19). I am of opinion this is very much under the mark. It is more common in these children than we are aware, but the uncertainty of the meaning of the word *croup* renders the returns as "diphtheria" exceedingly unreliable. I believe I am very nearly right—I will not say quite right, but very nearly so—when I say that *there is no such disease as croup.*

I have purposely inserted all the causes of death usually registered in this country, leaving blanks attached, to show how these affections have no part in the production of infantile mortality.

Finally, may I ask your attention to another important fact—viz., that this subject of "infantile mortality" seems to lie at the door of us *physicians* and not of the *surgeons.* With the high death-rate of children the surgeon appears to have little or nothing to do. I would that surgery might take with medicine its equal share of responsibility in this matter, but if you glance down these lists of deaths, how hard it is to find a purely surgical affection. They evidently die from "medical diseases." Whether it is that surgery in young children is more brilliantly successful, and that medicine is comparatively a failure, or whether it can be that the practice of medicine amongst children is but little understood by any of us, or whether, again, that a *surgical* disease may be so supernaturally transformed as to die with a medical certificate are questions which I leave to your wiser judgment to determine! One thing, however, is certain, and *in this connection it should be borne in mind* for it is perfectly clear, *that hospitals for sick children should be mainly devoted to medical work.* We must remember that in these matters we can deal only

with the *fatal cases*. We have no public records of disease kept in the United Kingdom. We can, therefore, only guess at the comparative frequency of any illness.

I would ask you to kindly recollect that I have here attempted to give you only the smallest possible "bird's-eye" view of the whole subject as it appears to me, but a view which is, I think, essential before any deeper study can be undertaken

I hope these few tables may be of some little use in pointing out the diseases from which young children are dying in Ireland at the present day, and which have to be fought against in any attempt to reduce our infantile mortality. They will, at least, lay a small but accurate foundation for further work on this subject. The chief of these diseases are ruled off at No. 11 on our list.

In conclusion only one word more—it is to return my cordial thanks to Dr. Grimshaw, our Registrar-General, for his kindness in lending me copies of his returns, some of which were out of print.

Also, I would refer you to a most able paper by Dr. Grimshaw on the social aspect of "Child Mortality in Dublin," which he traces to the four following causes:—

1st. Poverty.
2nd. Inferior House Accommodation of Artisans and Labourers.
3rd. Drunkenness.
4th. Carelessness.

Against these four causes then, and the first eleven diseases in my list, must be directed any and every crusade against the mortality of children in Ireland.

TABLE I.—*Summary of Deaths of Children under 1 year and under 5 years in the whole of Ireland, Dublin, Belfast, Cork, and Limerick Cities, with total Births and Deaths for Ten Years ending December 31st, 1896. (From Annual Reports of the Registrar-General).*

Total for Ten Years ending December 31st, 1896.

—	Total Births	Total Deaths	Deaths of Children under 1 year	Deaths of Children under 5 yrs.
Whole of Ireland ...	1,072,592	845,722	105,469	174,614
Dublin City ...	100,045	93,106	17,131	28,517
Belfast ,, ...	95,727	50,224	14,620	26,110
Cork ,, ..	32,013	28,757	3,881	6,355
Limerick ,, ...	16,341	13,181	1,773	2,696

TABLE II.—*For Ten Years ending December 31st, 1896.*

—	UNDER ONE YEAR. (Rate per 1,000 Registered Births). Out of every 1,000 Children born there die in 1st year	UNDER ONE YEAR. (Rate per 1,000 total Deaths). In every 1,000 total Deaths there die Children under 1 year	UNDER FIVE YEARS. (Rate per 1,000 total Deaths). In every 1,000 total Deaths there die Children under 5 yrs.
Whole of Ireland	98·6	124·7	206·4
Dublin City ...	171·2	183·9	306·2
Belfast ,, ...	142·2	291·0	519·8
Cork ,, ...	121·2	134·9	220·9
Limerick ,, ..	108·5	134·5	204·5

TABLE III.—*Classes of Disease most Fatal to Children in the Whole of Ireland for Ten Years ending December 31st, 1896.*

UNDER ONE YEAR. Causes of Death.		UNDER FIVE YEARS. Causes of Death.	
1 Local Diseases ...	46,444	1 Local Diseases	77,421
2 Ill-defined causes ...	30,716	2 Specific Febrile Zymotic Diseases	36,774
3 Specific Febrile Zymotic Diseases	15,400	3 Ill-defined causes ...	34,288
4 Constitutional Diseases	6,274	4 Constitutional Diseases ...	16,690
5 Developmental ,, ...	4,715	5 Developmental ,, ...	4,758
6 Violence	1,731	6 Violence	4,248
7 Parasitic Diseases ...	197	7 Parasitic Diseases ...	425
8 Dietetic ,, ...	52	8 Dietetic ,, ...	57

TABLE IV.—*Systems Affected or Orders of Diseases most fatal to Children in the Whole of Ireland during Ten Years ending 31st December, 1896, in the the order of relative morbidity.*

UNDER ONE YEAR.		UNDER FIVE YEARS.	
Causes of Death	Deaths under 1 year	Causes of Death	Deaths under 5 years
1 Ill-defined and not Specified Cause	30,716	1 Respiratory Diseases	34,557
2 Diseases of Nervous System	21,998	2 Ill-defined and not Specified Causes	34,228
3 Diseases of Respiratory System	18,976	3 Diseases of Nervous System	28,828
4 Miasmatic Diseases	8,423	4 Miasmatic Diseases	26,790
5 Constitutional Diseases	6,274	5 Constitutional Diseases	16,690
6 Diarrhœal Diseases	6,201	6 Diarrhœal Diseases	8,990
7 Developmental Diseases	4,715	7 Diseases of Digestive System	8,288
8 Diseases of Digestive System	4,690	8 Developmental Diseases	4,758
9 Accident or Negligence	1,325	9 Accident or Negligence	3,773
10 Homicide	406	10 Diseases of Integumentary System	590
11 Venereal Diseases	399	11 Septic Diseases	517
12 Septic Diseases	374	12 Diseases of Urinary System	458
13 Diseases of Integumentary System	336	13 Venereal Diseases	452
14 Parasitic Diseases	197	14 Homicide	430
15 Diseases of Circulatory System	187	15 Parasitic Diseases	425
16 Diseases of Urinary System	126	16 Circulatory Diseases	359
17 Dietetic Diseases	52	17 Diseases of Locomotive System	147
18 Diseases of Organs of Special Sense	48	18 Diseases of Organs of Special Sense	131
19 Diseases of Reproductive System	17	19 Dietetic Diseases	57
20 Diseases of Locomotive System	15	20 Diseases of Reproductive System	50
21 Zoogenous Diseases	13	21 Diseases of Lymphatic System and Ductless Glands	26
22 Diseases of Lymphatic System and Ductless Glands	11	22 Zoogenous Diseases	19
23 Malarial Diseases		23 Malarial Diseases	6
24 Suicide		24 Suicide	
25 Execution		25 Execution	

Table V.—*Registered Diseases and Actual Causes of Death of all Children in the Whole of Ireland for Ten Years ending December 31st, 1896, in the order of relative morbidity.*

	Under One Year. Causes of Death.	Deaths under 1 year
1	Debility, Atrophy, Inanition	29,136
2	Convulsions	20,764
3	Bronchitis	14,017
4	Diarrhœa and Dysentery	5,762
5	Whooping-cough	4,893
6	Premature Birth	3,827
7	Tabes Mesenterica	3,512
8	Pneumonia	2,519
9	Tubercular Meningitis	1,755
10	Measles	1,691
11	Croup	1,589
12	Dentition	1,201
13	Ill-defined and not specified Causes	1,176
14	Diseases of Stomach	1,145
15	Influenza	1,052
16	Inflammation of Brain and Membranes	923
17	Enteritis	796
18	Ill-defined Diseases of Respiratory System	645
19	Forms of Tubercle and Scrofula	637
20	Suffocation	578
21	Ill-defined Accidents or Negligence	498
22	Simple Cholera	418
23	Homicide	406
24	Syphilis	399
25	Spina Bifida	363
26	Ileus and Intestinal Obstruction	357
27	Scarlet Fever	356
28	Ill-defined Diseases of Liver	354
29	Erysipelas	314
30	Phthisis	231
31	Sore Throat, Quinsy	215
32	Ill-defined Diseases of Brain and Cord	202
33	Atelectasis	197
34	Thrush	186
35	Diphtheria	171
36	Laryngitis	164
37	Peritonitis	162
38	Burns and Scalds	160
39	Abscess	153
40	Dyspepsia	133

	Under Five Years. Causes of Death.	Deaths under 5 years
1	Debility, Atrophy, Inanition	32,062
2	Convulsions	25,261
3	Bronchitis	24,773
4	Whooping-cough	11,456
5	Diarrhœa and Dysentery	8,383
6	Tabes Mesenterica	7,564
7	Measles	7,557
8	Pneumonia	5,868
9	Croup	5,509
10	Tubercular Meningitis	5,069
11	Premature Birth	3,827
12	Scarlet Fever	2,919
13	Inflammation of Brain and Membranes	2,646
14	Dentition	2,399
15	Forms of Tubercle or Scrofula other than Tabes, Phthisis, and Tubercular Meningitis	2,190
16	Diseases of Stomach	2,000
17	Burns and Scalds	1,941
18	Influenza	1,909
19	Diphtheria	1,818
20	Ill-defined and not specified Causes	1,754
21	Enteritis	1,217
22	Phthisis	1,196
23	Ill-defined Diseases of Respiratory System	1,194
24	Enteric Fever	751
25	Suffocation	621
26	Accidents and Negligence not stated	613
27	Simple Cholera	607
28	Laryngitis	578
29	Diseases of the Liver other than Ascites, Gallstones, and Cirrhosis	495
30	Ill-defined Diseases of Brain and Cord	484
31	Sore Throat and Quinsy	480
32	Ileus and Obstruction	452
33	Syphilis	452
34	Homicide	430
35	Erysipelas	407
36	Spina Bifida	386
37	Rickets	378

Under One Year. Causes of Death.	Deaths under 1 year
41 Congenital Defects other than Spina Bifida, Imperforate Anus, Cleft of Palate	133
42 Eczema	129
43 Stomatitis	119
44 Cyanosis	110
45 Ill-defined Diseases of Circulatory System	102
46 Ill-defined Diseases of Integumentary System	100
47 Intussusception	84
48 Enteric Fever	79
49 Pemphigus	74
50 Syncope	72
51 Pyæmia and Septicæmia	59
52 Rickets	59
53 Cerebro-Spinal Fever	58
54 Sudden Deaths, Unascertained Causes	55
55 Anæmia, Chlorosis, Leucocythæmia	54
56 Imperforate Anus	54
57 Laryngismus Stridulus	54
58 Starvation and Want of Breast Milk	52
59 Phlegmon, Cellulitis	50
60 Hernia	48
61 Ill-defined Diseases of Urinary System	43
62 Dropsy	37
63 Chicken-pox	36
64 Otitis and Otorrhœa	34
65 Simple and Ill-defined Fever	31
66 Cleft of Palate, Harelip	31
67 Falls, Fractures, Contusions	29
68 Acute Nephritis	27
69 Ill-defined Diseases of Digestive System	25
70 Purpura and Hæmorrhagic Diathesis	24
71 Paraplegia and Diseases of Spinal Cord	24
72 Suppression of Urine	24
73 Ulcer, Bed-sore	21
74 Mortification	21
75 Tumour	21
76 Epilepsy	20
77 Drowning	19
78 Weather Agencies	18
79 Small-pox (Unvaccinated)	18

Under Five Years. Causes of Death.	Deaths under 5 years
38 Peritonitis	326
39 Drowning	266
40 Abscess	226
41 Ill-defined Diseases of Circulatory System	223
42 Eczema	223
43 Stomatitis	221
44 Thrush	218
45 Atelectasis	200
46 Animal Parasites, excluding Hydatids	194
47 Cerebro-Spinal Fever	187
48 Acute Nephritis	175
49 Simple and Ill-defined Fever	158
50 Falls, Fractures, Contusions	157
51 Paraplegia and Diseases of Spinal Cord	154
52 Dyspepsia	153
53 Dropsy	147
54 Ill-defined Diseases of Integumentary System	143
55 Congenital Defects other than Spina Bifida, Imperforate Anus, Cleft of Palate	138
56 Anæmia, Chlorosis, Leucocythæmia	123
57 Intussusception	121
58 Cyanosis	117
59 Ill-defined Diseases of Urinary System	113
60 Pyæmia and Septicæmia	106
61 Bright's Disease and Albuminuria	105
62 Laryngismus Stridulus	102
63 Otitis and Otorrhœa	102
64 Phlegmon, Cellulitis	101
65 Pemphigus	92
66 Syncope	79
67 Purpura and Hæmorrhagic Diathesis	77
68 Hernia	77
69 Poison: Poisonous Vapours	76
70 Sudden Deaths, Unascertained	75
71 Caries and Necrosis	70
72 Pleurisy	68
73 Epilepsy	65
74 Chicken-pox	64
75 Mumps	64

Under One Year.

	Causes of Death.	Deaths under 1 year
80	Mumps	17
81	Hematemesis	17
82	Poison: Poisonous Vapours	16
83	Hæmorrhage	16
84	Pleurisy	15
85	Emphysema Asthma	14
86	Diseases of Larynx and Trachea other than Laryngitis and Croup	13
87	Melæna	13
88	Cow-pox and Vaccination	12
89	Apoplexy	12
90	Ascites	12
91	Diseases of Bladder and Prostate	11
92	Animal Parasites, except Hydatids	10
93	Bright's Disease and Albuminuria	10
94	Epistâxis and Diseases of Nose	9
95	Diseases of Testes and Penis	9
96	Diseases of the Lymphatics	8
97	Diseases of Uterus and Vagina	8
98	Small-pox (no statement)	7
99	Uræmia	7
100	Ill-defined Diseases of Organs of Locomotion	7
101	Typhus	6
102	Ulceration of Intestine	6
103	Epidemic Rose Rash	5
104	Ill-defined Constitutional Diseases	5
105	Hemiplegia and Brain Paralysis	5
106	Ophthalmia and Diseases of Eye	5
107	Arthritis, Osteitis, Periostitis	5
108	Stricture and Strangulation of Bowel	4
109	Embolism and Thrombosis	3
110	Phlebitis	3
111	Caries and Necrosis	3
112	Vehicle and Horse Accidents	3
113	Small-pox (Vaccinated)	2
114	Rheumatism	2
115	Softening of Brain	2

Under Five Years.

	Causes of Death.	Death unde 5 years
76	Hemiplegia and Brain Paralysis	60
77	Vehicle & Horse Accidents	58
78	Starvation and Want of Breast Milk	57
79	Ill-defined Diseases of Digestive System	55
80	Imperforate Anus	54
81	Ill-defined Diseases of Organs of Locomotion, except Caries and Ostitis	47
82	Cleft of Palate, Harelip	36
83	Ulcer, Bed-sore	35
84	Endocarditis, Valvular Disease	34
85	Diseases of Larynx and Trachea other than Laryngitis and Croup	34
86	Tumour	34
87	Diseases of Uterus and Vagina	34
88	Small-pox (Unvaccinated)	33
89	Emphysema, Asthma	33
90	Mortification	33
91	Typhus	31
92	Cancer	31
93	Arthritis, Osteitis, Periostitis	29
94	Hematemesis	28
95	Ascites	28
96	Epidemic Rose Rash	27
97	Suppression of Urine	27
98	Weather agencies	27
99	Hæmorrhage	27
100	Apoplexy	26
101	Rheumatic Fever and Heart Disease	21
102	Ulceration of Intestine	20
103	Diseases of Lymphatic System	19
104	Melæna	18
105	Diseases of Bladder and Prostate	18
106	Epistaxis and Diseases of Nose	17
107	Uræmia	15
108	Stabs, Wounds, Weapons	14
109	Cow-pox and Vaccination	13
110	Ophthalmia and Diseases of Eye	12
111	Diseases of Testes & Penis	11
112	Hydatids	11
113	Pericarditis	10

Under One Year. Causes of Death.	Deaths under 1 year
116 Endocarditis and Disease of Valves	2
117 Pericarditis	2
118 Diseases of Spleen	2
119 Urinary Calculus	2
120 Hæmaturia	2
121 Carbuncle	2
122 Relapsing Fever	1
123 Glanders	1
124 Phagedæna	1
125 Hydatids	1
126 Chorea	1
127 Idiopathic Tetanus	1
128 Angina Pectoris	1
129 Aneurysm	1
130 Varicose Veins	1
131 Fistula (Alimentary)	1
132 Cirrhosis of Liver	1
133 Diseases of Thyroid	1
134 Mining and Quarry Accidents	1
135 Stabs, Wounds, Weapons	1
136 Other Miasmatic Diseases than the foregoing	
137 Remittent Fever	
138 Ague	
139 Hydrophobia	
140 Splenic Fever	
141 Vegetable Parasites other than Thrush	
142 Scurvy	
143 Alcoholism	
144 Rheumatic Fever and Heart Disease	
145 Gout	
146 Cancer	
147 Diabetes Mellitus	
148 Paralysis Agitans	
149 Insanity, G. P. of Insane	
150 Hypertrophy of Heart	
151 Gallstones	
152 Disease of Supra-Renals	
153 Disorders of Menstruation	
154 Ovarian Disease	
155 Pelvic Abscess	
156 Perineal Abscess	
157 Ship, Boat, and Dock Accidents	
158 Building Operations	
159 Machinery	
160 Lupus	
161 Suicide	
162 Execution	

Under Five Years. Causes of Death.	Deaths under 5 years
114 Small-pox (no statement)	10
115 Rheumatism	8
116 Diabetes Mellitus	8
117 Idiopathic Tetanus	7
118 Diseases of Spleen	6
119 Remittent Fever	5
120 Hydrophobia	5
121 Ill-defined Constitutional Diseases	5
122 Softening of Brain	5
123 Chorea	5
124 Embolism & Thrombosis	5
125 Stricture and Strangulation of Bowel	5
126 Carbuncle	5
127 Phagedæna	4
128 Phlebitis	4
129 Calculus	3
130 Perineal Abscess	3
131 Small-pox (Vaccinated)	2
132 Relapsing Fever	2
133 Other Miasmatic Diseases than the foregoing	2
134 Vegetable Parasites other than Thrush	2
135 Insanity, G. P. of Insane	2
136 Cirrhosis of Liver	2
137 Hæmaturia	2
138 Ovarian Disease	2
139 Mine & Quarry Accidents	2
140 Machinery Accidents	1
141 Diseases of Thyroid	1
142 Fistula (Alimentary)	1
143 Varicose Veins	1
144 Aneurysm	1
145 Angina Pectoris	1
146 Hypertrophy of Heart	1
147 Glanders	1
148 Ague	1
149 Splenic Fever	
150 Scurvy	
151 Alcoholism	
152 Gout	
153 Paralysis Agitans	
154 Gallstones	
155 Diseases of Supra-Renals	
156 Disorders of Menstruation	
157 Pelvic Abscess	
158 Lupus	
159 Ship, Boat, Dock Accidents	
160 Building Operations	
161 Suicide	
162 Execution	

Dr. Grimshaw (Registrar-General) said that in a great many of the deaths of children there was never any diagnosis made, there having been no medical attendant. Again, the medical man was only called in, in other cases, at the very last moment, and then for the purpose of giving a certificate for the insurance company. These two facts tended very much to damage the accuracy of such statistics. It was a question whether a medical certificate should be given in cases where the doctor was called in at the last moment and had no opportunity of making a diagnosis. He thought that the withholding of a certificate in a doubtful case had a most beneficial result, and should be always exercised by the medical attendant. Again, when a certificate was withheld the coroner should interfere. Medical men should be very particular as to what they put on death certificates; for instance, the primary cause might have been discovered in many of the cases recorded as "convulsions." He believed that, if there was better accommodation for children in hospitals, a great many of them would be better attended to. He thought that students were not sufficiently trained in the treatment of diseases of children.

Dr. Doyle said he had never been able to arrive at primary causes of diseases. Secondary and tertiary causes were easily arrived at. He maintained that convulsions, tuberculosis, meningitis, chorea, diphtheria, croup, whooping-cough lay within the province of the surgeon, and not the physician. Granular conditions in nares and back of pharynx often accounted for such diseases as convulsions. Whooping-cough could be cured only by the surgeon. The condition at the back of the fauces and nares should be attended to. Whooping-cough was caused by the continuous and repeated reinfection from the Eustachian tubes and back of the pharynx. Similar remarks applied to tuberculosis. There was still room in Dublin for more children's hospitals.

Dr. Falkiner said that Dr. Symes' Table No. I. showed the death-rate to be practically 1,000 per month in Dublin. If a new hospital were founded, room would have to be provided for all the sick children, those who die in the month, representing, perhaps, only one per cent. of all the sick children. He thought that the establishment of a new hospital with fifty beds would not have the smallest effect on the death-rate. His opinion was that medical relief was carried to the darkest parts of Dublin, and carried efficiently. The onus of neglected children was much more on the Government and the people of the country than on the doctors,

who did the work as well as they could. The matter of certifying for children in doubtful cases had caused him much trouble and worry for the last ten years. If a child dying of neglect were brought to a doctor, if the doctor believed the child to be dying of neglect it was his duty to see that the child was properly looked after. When a child dying of neglect was brought to him it was his custom to write to the Inspector of the National Society for the Prevention of Cruelty to Children, who generally succeeded in having the child cared for.

Dr. Turner dwelt on the great importance of having students properly taught the diseases of children. In Dublin, he thought, there was a great necessity for having an institute for children, where students would have an opportunity to receive instruction which would enable them to be successful practitioners with infants.

The President (Dr. Tweedy) said that it seemed to him that a large number of cases mentioned under the heading "Debility, Atrophy, Inanition," really came under the head of Preventive Medicine, and were largely due to unsanitary conditions generally, and also to the ignorance of parents. The system of feeding children was often most barbarous, starchy foods being continually given to infants. Children, he thought, might be admitted more often to the general hospitals in Dublin. It would be difficult to start a new hospital since there were already so many. Dispensary doctors had a great deal to do in attending the *parents* themselves, and had not possibly the time to devote to children that they required. What was the use of writing a prescription for a child when what it really wanted was warmth, cleanliness, food, &c.? The district nurse would be almost more useful in such cases than the doctor. If public contributions were given more towards children's wards in hospitals it would be a step in the right direction.

Dr. Symes (in reply) said it was a great relief to him to find that so many cases tabulated as "Indefinite" were cases in which the profession had really no hand at all. He agreed with the Registrar-General that the coroner should be communicated with in all cases where a medical certificate was not procurable. He endorsed Dr. Turner's remarks on the teaching of students. He was greatly relieved to hear that Dr. Doyle could cure consumption and whooping-cough by surgical methods. However, he thought that surgery had nothing to do with the deaths in the Tables. He thought there were already enough hospitals in Dublin, and that an amalgamation of some of them would be beneficial.

DISTRIBUTION OF CANCER IN ENGLAND.

By F. C. MARTLEY, M.A., M.D., M.R.C.P.I.

[Read in the Section of State Medicine, May 18, 1898.]

In choosing this subject I know that I have taken up a large one, and as yet I have not been able to touch more than its very fringe; but it may be of interest to follow even the short distance which I have gone.

One of the penalties which we seem to pay as a result of advancing civilisation is a very marked increase, as shown by the Registrar-General's Reports, of cancer; and here I may say that throughout this paper I use cancer as synonymous with malignant disease.

I felt that it might be of value to examine these reports, and to see whether any useful inferences could be drawn from the geographical distribution of the disease. Naturally I was somewhat influenced by the conclusions come to by Dr. Haviland ("Geographical Distribution of Diseases in Great Britain") which, put shortly, come to the following:—That cancer mortality amongst females in England is lowest in districts formed out of the older and more elevated rocks, where the rivers are not subject to floods; and highest on clay formations, where floods are more frequent.

First I examined the figures for 1891 for both sexes separately with reference to the eleven divisions into which England is divided for registration purposes. These districts are as follows:—

I. London.

II. The South Eastern.

III. The South Midland, extending from Cambridge to Oxford, and from Northampton to Bucks.

IV. The Eastern Shires.
V. The South Western.
VI. The West Midland, from Shropshire and Staffordshire to Gloucestershire.
VII. The North Midland from Leicestershire and Derbyshire to the East Coast.
VIII. The North Western, comprising Lancashire and Cheshire.
IX. Yorkshire.
X. The Northern.
XI. Monmouthshire and Wales.

I first noted that, in round numbers, 520 males died of cancer in England as a whole out of every million males living, and 850 females; but that in the first five divisions, comprising the district south of a line joining the Bristol Channel to the Wash, there was a marked excess registered, extending in one division up to 140 per million living more than was expected.

Another line might be drawn from the Dee to the Humber, and all the country north of this showed a marked relative freedom from cancer, averaging 80 or 90 less per million living than for England as a whole; while in the intermediate country the number of cancer cases was about the same as that for the whole country.

A moment's reflection showed that these figures were open to doubt, as the incidence of cancer is practically nil in early life, and very heavy in later, middle and old ages, and the proportion between young and old might be very different in the different divisions. Accordingly I divided the population into several age groups—the groups chosen being the younger years up to 25, and then ten yearly ones, the final one including all over 85—and calculated how many cancer deaths occurred in each group per each million living in that group.

Next I calculated out what the expected cancer death-rate

would be in each of the divisions by adding together the number that might be expected to die in each age group for the division in question; this gave what I may call an average cancer death-rate corrected for age distribution; and comparing these rates in each division with the number of cancer deaths registered, a much more correct view of the distribution of cancer was gained—in fact, it was seen to be markedly different. To quote only a few of the figures:—Amongst males in the south western division, before taking any account of age distribution there appeared to be 80 too many cancer deaths per million living, whereas after making due allowance there were 41 too few; in the northern division amongst females, instead of there being 92 too few, there were really 12 too many. This shows clearly what an erroneous view may be left by mere figures, at all events if the figures are accepted without due allowance being made for diversities of age distribution. Accordingly I shall now only discuss such duly corrected figures.

After examining the divisional distribution for each sex in a number of years between 1880 and 1895, I finally, with a view to avoid as far as possible accidental and temporary fluctuations, expressed as a single result the figures for the ten years 1886-95 by taking the average annual cancer death-rate and comparing it with the population of the middle of the period, as shown in the census of 1891. I thus found the excess or deficit in the number of cancer deaths for each division as compared with the average rate for England as a whole.

In round numbers, 510 males died of cancer annually during the decennium for every million living, and 823 females. The excess or deficit in the divisions is shown in the following table:—

DIVISION	MALES	FEMALES
I. London - - -	+140	+119
II. S. E. - - -	nil	+ 3
III. S. Mid. - - -	+ 9	— 29
IV. E. - - - -	— 58	— 33
V. S. W. - - -	— 44	— 71
VI. W. Mid. - - -	— 28	— 15
VII. N. Mid. - - -	— 54	— 15
VIII. N. W. - - -	— 17	— 28
IX. Yorks. - - -	— 33	+ 15
X. N. - - - -	— 17	+ 4
XI. Mon. & Wales - -	nil	— 71

On examining this table the first point to be noticed is the markedly greater prevalence of cancer in London over every other part of England. No doubt this may be in part due to many sufferers being attracted to London for the possibility of relief in metropolitan hospitals; but if this were so one might expect the surrounding counties to show a correspondingly diminished rate. At some future time I hope to go into this point, but I may say that any such investigation I have as yet taken, though far from complete, does not seem to support this view. Probably much must be put down to the general conditions of life in London, and something to its position in the lower part of the Thames Valley.

As regards the rest of England, for some districts the rates for males and females are somewhat similar and below the average—*e.g.*, in the south western and eastern divisions; but northward the rates for the two sexes diverge, males showing a rate below the average for Divisions VII. and IX., comprising the Lincolnshire district and Yorkshire, and situated on the east coast of England, while females show a similar band of low mortality but on the west coast, taking

in the Welsh and Lancashire districts. For this divergence I can suggest no cause; possibly if a longer period were taken it might disappear, but I may add that on examining the rates for the seven years 1881 and 1890-95 separately they always support the same distribution.

Another point is that the low rate for both sexes in low-lying East Anglia, and a rate about the ordinary in the mountainous northern division, shows that we are not justified in applying Haviland's conclusions, which I have already mentioned, to such large areas.

NOTES ON AN EPIDEMIC OF ENTERIC FEVER.

By W. A. WINTER, M.D., B.Ch. Dub., D.P.H.

[Read in the Section of State Medicine, May 18, 1898.]

During the latter months of 1890, and the early months of 1891, enteric fever was very prevalent in the Tees Valley, and, when the cases were grouped together, it was found that there was an especial incidence of the fever during two periods, each lasting about six weeks. The first of these was from September 7th to October 28th, 1890, and the second from December 28th, 1890, to February 7th, 1891. It was during the latter of these two periods that I came in contact with the cases of fever which presented the ordinary clinical features of enteric.

In endeavouring to trace the cause of these epidemics I must acknowledge my indebtedness to Dr. Barry's very able report, which he made on this subject to the English Local Government Board, as a great part of my information has been gleaned from that source.

When we attempt to trace the origin of an epidemic, it is necessary in the first place, to learn what is its distribution. The Tees Valley consists of 32 sanitary districts, and in only 10 of these 32 sanitary areas was there found to be an excessive incidence of enteric fever, or, to quote the numbers, it was found that of 1,479 cases of this disease occurring in the Tees Valley during the two six week periods in question, 1,352 or 92 per cent. were notified from the following 10 sanitary districts—1. Darlington Urban; 2. Darlington Rural; 3. Stockton Urban; 4. Stockton Rural; 5. South Stockton Urban; 6. Middlesborough Urban; 7. Ormesby Urban; 8. Normanby Urban; 9. Eston Urban; 10. Kirkleatham Urban. In this list it will be observed that eight of the districts were urban and two rural. I will refer again to this point later on.

The next point I will inquire into is—what common cause had these 10 sanitary districts that could lead to these epidemics? As far as I know, the only means of infection that have been proved may be grouped under one of the following headings—1. Defective drainage; 2. Infected food supply; 3. Infected water supply.

As one would expect in dealing with a mixed agricultural and urban population the methods employed throughout these 10 sanitary districts for the disposal of sewage were varied, and the defects in these systems, and indeed in the manner in which they were executed, were equally varied; hence, I think defective drainage may be neglected in seeking the cause of these outbreaks. While referring to the subject of defective drainage and enteric fever, I would like to say that I think that there is a great tendency among the public, and to a less extent with medical men, to attribute this disease in most cases to defective drainage, when it ought rather to be traced to some other source.

With regard to the food-supply, I think I may at once dismiss it, as it is impossible to think that this large population, living in a scattered district, could have a common food-supply.

I now come to the last cause which I have mentioned—the water supply. The 10 sanitary districts above referred to are chiefly supplied either by the Darlington Corporation Waterworks or by the Stockton and Middlesborough Water Board. I say chiefly supplied, for although they are practically the only source of supply in the urban districts concerned in the epidemics, the rural districts involved have a more varied supply, for in the Stockton rural district 1,335 houses drew their water supply from the Stockton and Middlesborough Water Board, while the remaining 918 houses have to depend on either public or private wells. A similar condition of supply exists in the Darlington rural district, where about one-sixth of the houses are supplied by

one of the above-mentioned Water Boards, and the remaining five-sixths are supplied by wells. Both these Boards draw their supply from the River Tees. Here there is a common cause acting over the whole area in which the enteric fever epidemics were present.

It will, I think, be useful at this stage to contrast the incidence of the fever in those living in the Tees Valley who consumed Tees water with those who did not use it. The 32 sanitary districts which comprise the Tees Valley have, roughly speaking, a population of 500,000. Of this total 219,000 were users of Tees water, while the remaining 281,000 were supplied from other sources; and, on comparing the enteric fever attack-rate of these two populations, I find that the consumers of Tees water exhibited 15 cases of typhoid for every case that occurred among those who did not use Tees water.

I mentioned in an earlier part of my paper that eight of the infected districts were urban and only two were rural, and it was found on examining the cases reported from these two rural districts that while certain villages reported an excess of typhoid cases, other villages were quite free of the disease. Can this difference be explained? I think it can; for if you remember what the water supply of the rural districts was, I think that it furnishes us with a possible explanation, and this possibility becomes a probability when we find that all the villages which showed an excess of typhoid obtained their water supply from the River Tees.

This fact confirms the suspicion aroused by the excessive incidence of the fever among the users of Tees water; and I will now enquire into the source from which the Water Boards obtained their supply, with a view to judging the possibility of its being polluted. The intake of the Darlington and also of the Stockton and Middlesborough Water Boards is situated on the River Tees, about two miles west of Darlington. A glance at the map shows that a very con-

siderable part of the river lies above this point, and hence the probabilities of such an occurrence are strong. But in such cases probabilities will not do; we must have facts, and the following are, I think, sufficient for my purposes:—The River Tees receives, above the intake of the Water Boards—either directly or indirectly—the sewage of 20 towns and villages, with an estimated population of 12,000. It also receives the surface drainage of many farms, some of them manured with night soil.

While referring to the pollution of the river, I may mention that although Barnard Castle is sewered throughout, many drains and privies have their direct outlet on to the river, and when the river is low, matter discharged from these tends to accumulate on the side of the river until such time as the water rises in flood and performs the duty of scavenger.

The water thus obtained is filtered through ordinary sand filter-beds before it is distributed to the consumers. I had frequent opportunity of analysing the water thus supplied, and I think the following analysis, which I made some time after the outbreak, fairly represents the average composition of the water. I may add that I have seen the results of numerous analyses made at the time the epidemics were present in the district, and all bore not only a close resemblance to each other, but also to the one I append, in which the quantities stated are grains per gallon:—

Description of Sample	From house supply
Appearance in 2 ft. tube	Light brown
Smell when heated to 100° F.	Nil.
Chlorine as chlorides	0·6
Phosphoric acid as phosphates	A trace
Nitrogen as nitrates and nitrites	Nil.
Ammonia	·00042
Albuminoid ammonia	·007
Oxygen absorbed 4 hours	·98
Total solids (dried at 212° F.)	7·120
Microscopical examination of deposit	No deposit

Although the above is not the analysis of a very pure water, yet I think few would condemn it as unfit for household supply. This opinion is supported by such authorities as Messrs. Frankland, Tidy, Stock, and Wilson, who were unanimous in pronouncing it to be a water of good quality and well suited for domestic supply, being free from any traces of sewage contamination; but this latter statement has to be considered in conjunction with the report of Dr. Hare, who states, as a result of his bacteriological examination, that "there was manifest evidence of sewage pollution. Another point of interest in connection with these outbreaks is the fact that it was not possible to demonstrate any previous case of enteric as having occurred which could have infected the River Tees above the intake of the water Boards.

I have now drawn attention to the main facts in the history of these epidemics, and I think that the weight of evidence points to the water supply as being responsible for the outbreak; but as there are some strong points against this conclusion, it will perhaps be well at this stage to briefly summarise the chief facts elicited before I give my reasons for condemning the water supply.

Typhoid fever was found to be very prevalent in the Tees Valley during two periods—separated by a distinct interval—of six weeks each; it was further found that 92 per cent. of the cases were reported from 10 out of the 32 sanitary districts comprised in the Valley; and again it was noted that the chief water supply of these 10 districts was from the River Tees, and that there were 15 cases of enteric fever among those living in the Tees Valley who used Tees water for every one case that was reported among those who did not use it. It has also been shown that the river was polluted above the point where the water supply of the infected districts was taken. There was also evidence furnished by bacteriology that the water was polluted by sew-

age, although chemistry failed to detect any sign of sewage contamination; and, lastly, there is the fact that it was not possible to trace a previous case of typhoid in the district.

In considering the facts as grouped above it is well to particularly bear in mind the large area over which the epidemics were scattered—in fact this one point is to my mind sufficient in itself to make me very suspicious of the water supply, and when we add to it the other points elicited against the water supply, I think that, in spite of the contrary evidence of chemical analysis and the inability to demonstrate a previous case, the epidemics must be classed as water-borne.

This conclusion is of course in direct opposition to the opinion of the analysts who examined the water, and it seems to suggest the question—Is chemical analysis of a water supply any safeguard, and, if it is, how far are we to trust it? My opinion on these points coincides with the history of those epidemics, for I think that while chemical analysis will indicate recent or gross pollution of a water supply, it will fail, as it did in this case, where the sewage was very diluted unless the analyst checks his results by the aid of bacteriology.

The other flaw in the chain of evidence is hardly worth considering, for it is familiar to everyone—how difficult it is to diagnose an isolated mild case of typhoid.

An interesting point still remains to be noticed—*i.e.*, why were these two epidemics separated by a short interval? Dr. Barry offers an ingenious, and to my mind quite a possible, explanation of this point. It will be remembered that when describing the manner in which the Tees was polluted I mentioned that at Barnard Castle sewage, &c., was apt to accumulate on the bank of the river until the water rose in flood and swept it away, and Dr. Barry shows that the river was in heavy flood on August 23rd, and early in December, and he thinks that the carrying away of the above-men-

tioned accumulation may afford a possible explanation of the outbreaks.

From a preventive medicine point of view there are many interesting side-issues arising out of these epidemics; for instance, they serve to recall to our minds that the filtration of water as usually carried out on a large scale is not capable of completely removing bacteria or their spores, and must be supplemented either by efficient domestic filtration or by boiling the water; further, they form a plea for the universal adoption of the Infectious Diseases Notification Act; and lastly, I think they point out to us the value of such appointments as Medical Officer of Health to a country or large district, who is able from returns furnished to him to group cases together, and so in outbreaks like those I have narrated trace the cause of the epidemics.

SECTION OF ANATOMY AND PHYSIOLOGY.

CRANIO-CEREBRAL TOPOGRAPHY.

[February 4, 1894.]

PROFESSOR SYMINGTON (Belfast) gave a lantern demonstration, and exhibited specimens and photographs, to show a method he had devised to illustrate the relations of the scalp and skull to the external surface, and to the internal parts of the brain.

The entire head was injected with a solution of formalin, at first 1 in 5, and subsequently 1 in 10. The injection was repeated, and the head kept in a solution of formalin until it was thoroughly hardened. Before freezing the head it was injected with a solution of gum, to prevent, as far as possible, the minute cracking and tearing of the brain, which is so apt to occur as the result of the freezing process. The entire head was fixed in position in a box, which was filled with a solution of gum. It was frozen, and then cut through a given plane—horizontal, coronal, or sagittal—into a series of slabs. The various slabs were placed in position again, sheets of cardboard being placed between them to compensate for the thickness of tissue removed by the saw. A photograph was then taken of one side of the head to show the position of the various cuts on the scalp. The soft parts were removed on one side, *en masse*, down to the bone, and another photograph taken to indicate where the skull was divided. venous sinuses, were next removed, and a photo taken of the The bone and the dura mater, except in the position of the surface of the brain. The cut surfaces of the various slabs were then photographed and additional sections made through the brain with a large knife, as required to show

the extent of the basal ganglia, lateral ventricles and other internal parts of the brain.

The advantages claimed for this method were that it demonstrated not only the relation of the scalp and skull to the surface of the brain, but also the position of the deeper parts of the brain to the superficial surface of the scalp and cranium. From such a series of sections orthogonal projections of the internal parts of the brain can easily be made on to the surface of the head.

The author expressed his indebtedness in the photographic part of this research to Dr. Cecil Shaw and Miss Patterson.

PROFESSOR CUNNINGHAM said that he had listened to Professor Symington's paper with the greatest interest. He thought that the specimens which he had shown were probably the most beautiful specimens of cranio-cerebral topography he had ever seen. He (Prof. Symington) was perfectly right in saying that the surface should be always combined with the interior, and by his method he was able to do this. Formalin was of enormous help in such work. He concluded his remarks by expressing his appreciation of the way in which Professor Symington had fulfilled the duties of President of the Section for the last two years.

THE SHAPE AND POSITION OF THE BLADDER IN THE CHILD.

By A. BIRMINGHAM, M.D.;

Professor of Anatomy, Catholic University, Dublin.

[Read in the Section of Anatomy and Physiology, June 3, 1898.]

In the year 1889, soon after the publication of Professor Symington's work on the Anatomy of the Child, I commenced an investigation into the shape and position of the child's bladder, by what I believe was then a new method. The difficulty of procuring suitable material was so great that after continuing the work for nearly two years, during which time only six bodies of a proper age were available, I finally suspended operations, in the hope of being able to carry my investigations to a more satisfactory termination at some future time, a hope which so far, I regret to say, has not been fulfilled. However, as there seems at present to be no immediate prospect of suitable material coming into my possession, I have decided to publish a short account of the work so far as it has gone.

Although, in approaching the subject, I recognised fully the invaluable aid which the sectional method has given to anatomical research, still I felt that it was possible to overrate this aid, and to place too much reliance on its results were they not checked by different methods. A frozen section shows perfectly the relations of a part or organ in any given plane, but much as to the general shape and surroundings remains to be made out by other means. In the bladder particularly this seemed to be the case. I consequently sought for some new method of examining this organ in the child, hoping thereby to be able to corroborate the results which Professor Symington had obtained by the

sectional method, and, perhaps, to add somewhat to our knowledge of the organ.

After some consideration of the subject, I hit upon a plan which, it seemed to me, was likely to yield satisfactory results.

METHOD.

My idea was to inject the bladder to a state of natural distension with some material of about the same specific gravity as urine, which would soon solidify, and which would be elastic enough to regain its shape if slightly disturbed. After injecting the bladder and allowing the injected material to set, the abdomen was to be opened, the level of peritoneal reflection observed, and a cast made of the bladder with the surrounding parts *in situ*. The bladder was then to be removed with as little disturbance of its shape as possible, having previously marked on it the level of the pelvic brim, and a cast of it also made. Finally, the injected organ, after removal and casting, was to be cut across at the level of the pelvic brim, and the amount of injection contained above and below the brim measured.

The first difficulty in carrying out this plan was the selection of a suitable injecting material. Plaster-of-Paris was first tried, and rejected, owing to its great weight, which produced decided distortion, and for other reasons. Finally, however, a solution of gelatine was considered the most satisfactory, and was accordingly selected. It is light, and easily manipulated, it solidifies with sufficient rapidity, and it is possessed of a most important quality for such purposes as the present—namely, it is extremely elastic, and quickly regains its original shape when disturbed.

Another difficulty was the quantity to be injected. At first it was simply guessed by the amount of resistance offered to the syringe during injection, which was, of course, a very unsatisfactory method. Next, an attempt was made to inject with the aid of a bent tube to a measured

pressure of so many inches of jelly, but owing to the viscid nature of the injection, this was found impracticable with the very narrow tubes which could be fitted into the small urethra of a child. At length a plan was devised which removed this difficutly. The bladder was first emptied as completely as possible with a catheter, then one limb of a glass tube, which was bent at right angles, was introduced into the urethra, and water poured through it into the bladder, until finally it stood at a given pressure, say six inches, in the vertical limb of the tube outside the urethra. The water was then drawn off and measured, and a quantity of jelly exactly equal to the water drawn off was introduced into the bladder, either with a syringe or through the tube. Unfortunately I was unable to find any table of the normal pressure within the distended bladder of the child at different ages. In fact the only information I could obtain on the subject of the intravesical pressure was the well-known statement, found in most physiological text-books, that, with the spinal cord intact, the bladder (of the adult) can withstand a pressure of twenty inches of water, but when the connections with the cord are severed, it is capable of withstanding a pressure of only six inches. From these slender data I had to form my conclusions as to what the pressure might be in the child at various ages. After making a few injections under a fixed and predetermined pressure, I observed certain facts in connection with the injection which seemed to afford a simple and satisfactory method of determining the normal full distension of any particular bladder.

I found, on injecting the water, that fluid flowed freely into the bladder, even with a very small pressure in the vertical limb of the tube, and that every slight increase in pressure was immediately responded to by the entrance of more fluid up to a certain point. When, however, this critical point was reached, even a considerable increase in

the pressure caused comparatively little more fluid to enter. This point, it appeared to me, indicated the full normal distension of the organ.

Having injected the bladder, first with water and then with jelly, in the method just described, the body was placed on its back on a sloping surface and set aside to allow the jelly to solidify. When sufficient time had elapsed for this to take place, the abdomen was opened in the following way:—A vertical incision was made on each side, from the thorax to pelvis, about $\frac{3}{4}$ inch from the middle line. This went at once through all the layers of the abdominal wall. Transverse cuts were also made on either side. There remained, when the cavity had been thus exposed, a median band of the anterior abdominal wall extending from thorax to pubes; on the back of this the level of peritoneal reflection was carefully noted. The band was then cut, and reflected up and down. A long, sharp pin was now driven through the symphisis pubis and through the bladder until the point was lodged in the sacrum posteriorly—this to prevent any movement of the organ. The sacro-vertebral angle and the upper margin of the symphysis pubis having been carefully defined, two small pins were inserted into the bladder, on the back and front, exactly opposite these points. In this way the level of the pelvic brim was distinctly marked on the bladder. Then—the intestines, with the exception of the sigmoid flexure and the rectum, having been cautiously removed in some specimens, whilst in others they remained undisturbed—a cast of the abdomen was made, which showed the position and relations of the bladder and the surrounding structures *in situ*.

Next, the bladder was removed, great care being taken that its shape was not altered in this process—a matter which, owing to the elastic nature of the injecting material used, gave rise to no great difficulty. A thin twine was

fixed around it at the level of the pelvic brim, as indicated by the small pins previously inserted, and a cast of the organ thus prepared was made. This cast showed the size and shape of the bladder; and the encircling twine, which in the cast appeared as a slightly elevated ridge, indicated the line along which the plane of the pelvic brim intersected the bladder, and showed at a glance how much of the organ lay in the pelvis and the abdomen respectively.

Finally, after the cast of the bladder had been made, the injected organ was cut across along the twine, that is, along a plane corresponding to the brim of the pelvis, and the jelly in each resulting part was melted separately and measured. This gave exactly the amount of the contents of the injected bladder which lay above and below the pelvic brim respectively.

Results.

I shall here detail briefly the chief points concerning each of the specimens, and then state the conclusions to which I have come from an examination of the series. Unfortunately two of the bladders—those of a one day, and of a nine months old child—got injured during or after removal, consequently casts of these are wanting.

No. 1. *Male child one day old.*—Urine drained off by catheter, jelly injected, amount of injection judged by resistance offered. (In passing, it may be remarked here, that as a rule, in males, I slit open the urethra along its ventral aspect fully down to the base of the penis, in order to facilitate the introduction of the injection.)

In this case the distension of the bladder seems to have been complete—possibly excessive. The abdomen was opened in the manner described above; the reflection of the peritoneum from the bladder on to the anterior abdominal wall was found to be at a point midway between the umbilicus and the top of the pubes. Casts having been made as

already described, the bladder was cut across at the level of the pelvic brim, and the contents of each division measured. The part within the pelvis contained 4 drachms, the part in the abdomen 5 drachms 5 minims.

On looking at the cast of the abdomen, one is struck by the marked projection of the bladder into the abdominal cavity; and from an inspection of this specimen it can easily be understood how it became the custom to describe the bladder in the child as almost entirely an abdominal organ. But this abdominal position of the viscus is to some extent apparent rather than real, as the following considerations will show:—(1) If the cast of the removed bladder alone be examined, it will be seen that. although there is so large a portion of it in the abdomen, still much more than would be imagined from viewing the open abdomen lies within the pelvis. (2) On measuring the contents it is seen that the amount above the pelvis exceeds the amount within it by only 5 minims. (3) In the infant the pelvis seems as it were, to project into the abdominal cavity proper, probably on account of the slightly developed lumbar curve, and the small development of the lower, or pelvic, as compared with the upper part of the abdomen. (4) The bladder *seems* to project out of the pelvis more than is really the case, on account of the small size of the pelvis relatively to that of the bladder at this time of life. But, as shown, even at the early age of one day, almost equal parts of the bladder lie above and below the level of the pelvic brim.

In shape this bladder is a somewhat elongated ovoid, slightly flattened from above downward in its pelvic portion. The abdominal is a little larger than the pelvic end or base, which latter does not project posteriorly, even to the slightest degree, behind the attachment of the diminutive prostate; in fact, a vertical line let fall from the most

prominent part of the organ would cut the posterior part of the prostate.

No. 2. *Male child one day old.*—The bladder was injected to what was judged, by the resistance and by measurements previously made, to be slight distension. The blood-vessels were also injected from the thorax, and the other steps described above carried out.

The peritoneal reflection took place one-eighth of an inch above the mid-point between pubes and umbilicus. Some time elapsed after the injecting before the bladder was removed, with the result that it was unfit for casting.

The cast of this abdomen and of specimen No. 1 show well the large triangular surface of the child's bladder, bounded at each side by the hypogastric artery, with the base at the pubes and the apex at the urachus, which lies in direct contact with the abdominal wall, without the interposition of peritoneum.

No. 3. *Male aged nine months.*—Jelly was injected in the method described until a pressure equal to six inches of water was reached. On opening the abdomen the peritoneal reflection was found to be situated at a point one line below the junction of the lower and middle thirds of the distance from umbilicus to pubes. The abdomen was cast, the bladder removed, and a mould of it secured, which unfortunately was broken before a cast had been obtained. A cast of the removed bladder of this child is therefore wanting in the series. The abdomen shows the gradual sinking of the bladder into the pelvis as the age advances; it is neither absolutely nor relatively so prominent as the bladder in the child at birth. The abdominal end was larger than the part situated in the pelvis.

No. 4. *Male child of four years—very small for this age.*—The bladder was injected to a pressure of 8 inches of water. The peritoneal reflection took place at a point half way between the pubes and the umbilicus. Casts having

been made, the bladder was divided, and the contents of its two parts measured. In the pelvis were 2 oz. 2 drms., above the pelvis 1 oz. 4 drms. 50 mins., making a total capacity of 3 oz. 6 drms. 50 mins.—not an excessive amount, in view of the fact that a child of four years may pass over 4½ ounces at one micturition. However, as pointed out above, this child was remarkably small for his age.

The cast of the bladder, which was certainly quite full—if not, perhaps, over-distended—is egg-shaped, flattened somewhat from above downwards, the wide end of the ovoid being directed forward and upward, the narrower end backward and downward. This latter end projects to a moderate extent behind the plane of the prostate.

In this case, instead of being a true ovoid, the bladder seems to be made up of halves of two unequal ovoids, joined about the brim of the pelvis. The smaller half occupied the pelvis, the larger projected into the abdomen.

No. 5. *Male, aged six months—a large child.*—Bladder injected with jelly to a pressure of 6 inches. The peritoneal reflection was at the junction of the lower and middle thirds of the distance between the umbilicus and pubes. Casts of the abdomen and bladder having been made, the bladder was removed and divided. The pelvic portion contained 1 oz. 40 mins., the abdominal portion 1 oz. 3 drms.

The cast of the bladder, although of large size, shows, by the large amount which projected out of the pelvis, that it belonged to a young child. The shape is that of an elongated and slightly asymmetrical ovoid, with a wide end directed forward and upward, and a narrow end looking in the opposite direction. This end projects slightly behind the plane of the prostate and urethra.

No. 6. *Male, aged two years.*—In this case the bladder was first emptied of urine, and injected with water to a pressure of 3 inches, at which pressure 2 oz. 1 dr. 10 mins. entered; the pressure was then increased to 8 ins., when

only an additional 1½ drms. entered; 2 oz. 1 dr. 10 mins. of jelly were then rejected.

The peritoneal reflection was remarkably low—namely, only ¼ inch above the pubes, the distance from pubes to umbilicus being 2½ inches. Casts having been made, the division of the bladder gave the following results—in the pelvis, 1 oz. 5 drms.; above the pelvis, 4 drms. 10 mins. The cast of the abdomen shows at a glance that the bladder is not nearly so prominent in this case as in the younger subjects.

The cast of this bladder gives, I believe, a more correct idea of the shape of the moderately distended bladder of the child than any of the others of the series. The shape is ovoidal, the slightly larger end being directed forward and upward, the narrower end backward and downward. The outline is irregular, owing to the fact that the bladder had been impressed by the surrounding structures; and this is, I believe, the natural condition of the moderately distended organ.

Conclusions.

I. *As to the level of the peritoneal reflection from bladder to anterior abdominal wall.* It was as follows:—

In two children, each one day old: half way between pubes and umbilicus.

In a six months child: at the junction of the lower and middle thirds of the interval between pubes and umbilicus.

In a nine months child: at the same level as the preceding.

In a two years child: one-quarter inch above the symphysis, *i.e.*, one-tenth of the distance between pubes and umbilicus.

In a four years child: half way between the pubes and umbilicus; this with a very full bladder which would raise the level.

These facts speak for themselves; they show the high

level at birth, the gradual descent, with the occasional irregularity.

II. *As regards the position of the bladder.*—The casts give a clear idea of the extent to which the bladder may be considered an abdominal organ in the child at various ages. It will be noticed that even at birth, when its projection into the abdomen proper is most marked, very little more than half of the organ projects out of the pelvis, and this even with a fully distended bladder; with less distension there would be relatively less of the bladder in the abdomen. On examining the casts at more advanced ages the gradual sinking into the pelvic cavity is observable without interruption, as we pass from the youngest to the oldest specimen.

The amount of jelly contained in the abdominal and pelvic portions of each bladder shows this even more strikingly. In four bladders from children of different ages, the amount above and below the pelvic brim was as follows:—

One day old: in pelvis, 4 drms.; in abdomen, 4 drms. 5 min.

Six months old: in pelvis, 1 oz. 40 mins.; in abdomen, 1 oz. 3 drms.

Two years old: in pelvis, 1 oz. 5 drms.; in abdomen, 4 drms. 10 mins.

Four years old: in pelvis, 2 oz. 2 drms.; in abdomen, 1 oz. 4 drms. 50 mins.

Notwithstanding all this, it must be admitted, on looking at the cast of the child one day old, that the bladder in its general appearance is at this age very largely an abdominal organ.

III. *As to the shape of the child's bladder.*—The shape of the distended bladder within the body will be in great part determined by three factors—namely (1) the pressure within the bladder; (2) the pressure exerted upon it by the sur-

rounding structures; and (3) the absolute or intrinsic shape of the organ itself.

The intrinsic shape of the bladder in the child is, I believe, approximately that of an egg flattened somewhat from above downwards, with the slightly larger end directed upwards and forwards, and the smaller end downwards and backwards.*

Its assumption of this shape in the body will depend on the pressure of its contents, as compared with the pressure in surrounding parts, particularly in the rectum. If the pressure in the rectum be greater than that in the bladder, the former will indent the latter, and thus disturb its symmetry. If, on the other hand, the pressure within the bladder be the greater, the rectum can produce but little effect upon its form, which will then approach nearer to a true ovoid. But this intravesical pressure—which is, of course, the result of distension, as a rule—is liable to produce asymmetry in another way. Owing to the position of the bladder—lying as it does partly in the diminutive pelvis of this age, partly in the more roomy abdomen—the pelvic portion is surrounded by resistant structures, and can expand with less freedom than the abdominal portion, which, to a large extent, is free from any such restraint. Consequently, when the bladder is fully distended, there is a tendency for the abdominal segment to undergo an enlargement out of proportion to that of the rest of the organ, with a resulting disturbance of symmetry.

The condition of the base of the bladder varies at different ages. In the child at birth it is very slightly developed, and runs upward from the posterior wall of the urethra, practically as a vertical surface, forming no bulging

* In a mesial frozen section through such a bladder, the abdominal might appear to be smaller than the pelvic end (although the reverse is really the case), owing to the flattening from above downwards affecting chiefly the abdominal portion. In other words, it is only by making sections in two different planes, by a reconstruction method, or by injecting the organ *in situ*, that the true shape can be realised.

whatsoever posteriorly over the prostate. At six months it projects very slightly backwards behind the plane of the posterior wall of the urethra; and at four years the projection is distinct, behind both prostate and urethra, though not great.

Finally, taking the average condition with moderate distension, the bladder of the child under four years of age may be described as being egg-shaped, somewhat flattened from above downward, with the slightly larger end directed forward and upward, and the base, which is only feebly developed, projecting backwards very little, or not at all, behind the posterior surface of the prostate.

ACCOUNT OF AN UNUSUAL COURSE OF PHRENIC NERVE.

By JOHN BARTON, M.D.;
Demonstrator of Anatomy, Royal College of Surgeons.

[Read in the Section of Anatomy and Physiology, June 3, 1898.]

The following arrangement of the right phrenic nerve was observed in a male subject during the past session in the dissecting room of the Royal College of Surgeons. The nerve came off from the 4th cervical nerve, and ran for an inch and a half in the cord containing the 5th and 6th cervical nerves, while in the sheath it received a branch from the 5th nerve; it then passed downwards and inwards behind and in contact with the posterior surface of the sterno-mastoid muscle; it crossed the subclavian vein opposite the insertion of the scalenus anticus muscle. In the thorax it lay in front of the right innominate vein, crossed in front of the internal mammary artery, lying to the outer side of the superior cava, and then joined the pericardium, and from this to its termination its course was normal. The nerve was half an inch in front of both the scalenus anticus muscles and the subclavian artery, and did not come in contact with either of these structures.

H. St. J. Brooks read a paper on the variations of origin of the phrenic nerve, which is contained in Vol. V., 1887, of the Transactions of this Academy, but does not record any observation similar to this. I may mention that the statement in the books that the phrenic nerve crosses over the internal mammary artery is not the invariable rule. In five subjects this session the nerve passed under the artery—three times on the right and twice on the left side.

A STUDY OF THE ARRANGEMENT OF THE MUSCULAR FIBRES AT THE UPPER END OF THE ŒSOPHAGUS.

By A. BIRMINGHAM, M.D.;
Profsesor of Anatomy, Catholic University.

[Read in the Section of Anatomy and Physiology, June 3, 1898.]

With the current description of the longitudinal muscular fibres at the upper end of the œsophagus, in which these fibres are said to divide into three longitudinal bands—an anterior attached to the vertical ridge on the back of the cricoid cartilage, and two lateral bands which are described as becoming connected above with the lower fibres of the inferior constrictor (Quain, &c.), or with the elastic tissue in which the palato-pharyngeus ends (MacAlister), I have never felt quite satisfied. Independent of the fact that I had never seen such an arrangement shown to my satisfaction in a dissection, it seemed to me extremely improbable that the lateral bands described, formed as they were of longitudinal fibres, should join the all but horizontal fibres of the lower edge of the inferior constrictor. Nor did it seem likely that these important bands, which have so much to do with the fixation of the œsophagus, would be dependent upon such a slight support above as that offered by the elastic tissue connected with the lower part of the palato-pharyngeus.

Suitable material having come into my hands, I recently made a careful study of these fibres, on a series of dissections which I had specially prepared with this object, and as a result I would offer the following account of the arrangement of the muscular fibres in the lower part of the pharynx and the upper end of the œsophagus.

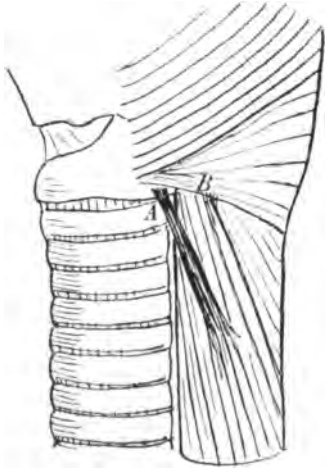

Fig. 4.

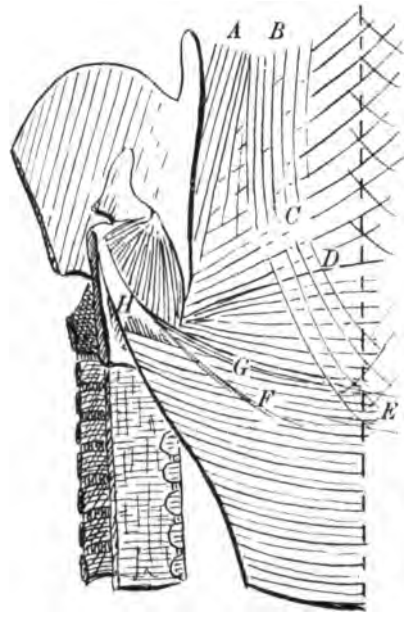

Fig. 5.

The outer or longitudinal muscular fibres form over the œsophagus generally, with the exception of its upper end, a well developed continuous layer of longitudinal bundles running parallel to one another, and in the direction of the tube. This layer, which is considerably thicker in general than the circular layer, will be distinctly displayed if the connective tissue which lies outside the muscular coat, be carefully removed from an œsophagus which has been moderately distended, and still retains its connections with the larynx.

On viewing the posterior aspect of such a preparation it will be seen that the longitudinal fibres on this surface form a continuous layer until a point 1 to $1\frac{1}{4}$ inches below the cricoid is reached. Here the longitudinal fibres on the back of the tube divide into two lateral halves (E, E, Fig. 1), which gradually separate from each other and wind round to the side, leaving a V-shaped interval between the diverging masses above (D, Fig. 1). As they pass round to the sides these fibres form two stout bands, the bundles of which run obliquely or somewhat spirally upwards and forwards (D, Fig. 2). They ascend beneath the lower margin of the inferior constrictor, and, having been joined by the longitudinal fibres of the side and front of the gullet, they wind round to the front, where meeting, they end below the middle of the back of the cricoid, on a stout flat tendon (A, Fig. 3), through the medium of which they are attached to the cricoid cartilage. This tendon, which is about $\frac{1}{4}$ inch in width above, and somewhat wider below, runs up over the back of the cricoid, and, having being joined by certain other fibres, which will be described below, it is finally attached to the upper end of the vertical ridge of the cricoid cartilage, near the point at which this ridge passes into the upper border of the quadrilateral plate (Fig. 3). Whilst this, so far as I can see, is the usual termination of these two bands of longitudinal fibres in the majority

of cases, still it will be occasionally found that some few of their superficial and posterior fibres are connected to the lower margin of the inferior constrictor evidently by the intervention of connective tissue. (B, Fig. 4). In other cases a few of the superficial fibres form a small independent bundle, which is attached above to the lateral part of the inferior margin of the cricoid cartilage (A, Fig. 4).

As the "longitudinal bands" described above pass forwards and upwards round the side of the œsophagus their disposition is such that on casual examination one might easily fall into the error of thinking that they were connected to the lower margin of the inferior constrictor. A careful dissection, however, will show that this is not the case, and that while none, or at most, in some cases, very few of their fibres are attached to the inferior constrictor, the bands pass on beneath the lower margin of this muscle (Fig. 2), to reach their common tendon on the front, as already described.

The arrangement of the longitudinal fibres will be far better under understood if, instead of tracing them from below upwards, we follow the more natural plan of tracing them from their origin above downwards along the tube, thus:—The longitudinal fibres of the œsophagus arise by a stout tendon $\frac{1}{4}$ inch in width above, wider below, from the upper end of the vertical ridge on the back of the cricoid. This tendon, somewhat below the middle of the cricoid, gives rise to two stout muscular bands, which lie close together on the front of the tube at their origin, but diverge immediately below this, each passing round on the lateral aspect, and gradually spreading out in a dorsal direction, until finally, at a point about $1\frac{1}{4}$ inches below the cricoid, the fibres of opposite sides meet behind, and form from this down, all round the tube, a continuous layer of longitudinal fibres.

This arrangement will be made clearer by a reference to the accompanying figures, 1, 2, and 3.

If the front of the upper portion of the œsophagus be examined the "two lateral bands" will be seen winding round from the sides, and meeting higher up before their common tendon is reached. Below this meeting the comparative fewness of the longitudinal fibres on this aspect near the middle line is noticeable for a few inches down. So few, indeed, are the fibres of the outer layer here that the circular fibres are distinctly visible through their scant longitudinal covering.

If we next turn our attention to the posterior aspect of the upper end of the tube, two questions will naturally arise—how is the V-shaped interval on the back between the diverging lateral bands filled? And how exactly is the muscular wall of the œsophagus connected posteriorly to that of the pharynx?

As regards the first question, it may be briefly stated that the V-shaped interval, which measures nearly 1¼ inches from above downwards, is filled by the circular fibres of the œsophagus, covered over in its lower and greater portion by thin and scattered longitudinal fibres derived from the outer layer; and above for nearly ½ an inch, by the lowest fibres of the inferior constrictor, which pass down for a short distance over the upper part of the œsophagus, overlapping and blending with its highest circular fibres.

If the outer surface of the inferior constrictor be carefully dissected, it will be seen that this part is made up of two portions differently arranged—(*a*) an upper and much larger portion, consisting of all the fibres springing from the thyroid cartilage, and the upper and superficial portion of those arising from the cricoid (B, Fig. 1, and A, Fig. 2); and (*b*) a lower part consisting of the deeper fibres of the cricoid origin (C, Fig. 1, and B, Fig. 2). The muscular bundles in the upper division are of a redder colour, and run obliquely upwards and towards the middle line, where they join the raphe, or, more correctly, decussate irregularly

with those of the opposite side. The lower division of the inferior constrictor is paler in colour, and is made up of fibres which are more horizontal in direction, and which, unlike those of the upper division, *do not decussate or form a raphe*, but on the contrary run continuously from side to side in the form of annular (or more correctly C-shaped) bundles. This, which might be described as an œsophageal portion of the inferior constrictor, is apparently transitional between the constrictor and circular fibres of œsophagus, and is evidently specially modified in order to serve (somewhat after the fashion of the "adapter" of a syringe) as the means of union between the muscular coats of the œsophagus and pharynx. It is narrow at each end where it springs from the postero-lateral aspect of the cricoid below and under cover of (*i.e.*, internal to) the cricoid origin of the main division of the constrictor. It is much wider—nearly $\frac{3}{4}$ inch in the middle, being somewhat diamond shaped with the long axis horizontal. Above it runs up into the interval between the lowest pair of decussating bundles of the constrictor, while inferiorly it passes down for over $\frac{1}{4}$ inch filling the upper and wider part of the V-shaped interval between the two longitudinal bands, and here overlapping and blending with the highest circular fibres of this part of the œsophagus. Its lower margin is very distinct on the lateral aspect (Fig. 2), where it is seen passing back from the cricoid across the recurrent nerve and the band of the longitudinal fibres. But posteriorly it is much less distinct, in fact, it is frequently difficult to make it out with certainty here.

In this way the upper part of the V-shaped interval is filled in. The lower portion of the V is occupied by the circular fibres of the œsophagus, covered by an extremely thin layer of somewhat pinnately arranged fibres derived from the outer layer (D, Fig. 1). If the two longitudinal bands descending from their tendon of origin round the sides of the œsophagus be carefully examined, it will be seen, that while the main

mass of the two bands meet only at a point about 1¼ inches below the cricoid, scattered fibres start off from their posterior margins, at different levels, which wind round more rapidly to the back and meet (or decussate) in the middle line posteriorly. The highest of these fibres come off from the lateral bands near their upper ends, and pass back forming very open Vs immediately below the "œsophageal portion" of the inferior constrictor, while the succeeding fibres form more and more acute Vs, until they finally fit into the angle between the two longitudinal bands where these meet below. This arrangement will be made clearer on referring to Fig. 1, which gives a posterior view of the upper end of the œsophagus.

Such is the arrangement of these fibres, but it must however be understood that they form an extremely thin and scant layer, but imperfectly hiding the circular fibres which really fill up the V-shaped gap between the lateral bands.

There still remains for us the second question—How exactly do the circular fibres end above?

By dividing the larynx and trachea along the middle line, and with them the anterior wall of the œsophagus, and removing the mucous membrane and submucosa, it can be shown that the circular fibres at the back of the œsophagus pass into continuity with the deeper fibres of the "œsophageal portion" of the inferior constrictor; and it is difficult on inspecting this part (posterior wall) alone to tell where one ends and the other begins. On passing round to the lateral and anterior aspects, however (Fig. 3), the highest circular fibres of the œsophagus can be easily determined, and, as pointed out above, they will be found joining the lateral margins of the common tendon (C, Fig. 3). Indeed those upper fibres just referred to, seem to form a transitional stage, between the ordinary circular fibres of the œsophagus, and the "œsophageal portion" of the inferior constrictor.

It will sometimes, but not invariably, be found on making the above dissection that the highest and deepest circular fibres of the œsophagus on this aspect show a slight obliquity (the fibres sloping a little upwards as they approach the middle line) with a tendency to a faint decussation (E, Fig. 5). On each side of the middle line the fibres, apparently after decussating, are connected with two thin flat muscular slips (D, Fig. 5), which arise one on each side, about the level of the middle of the thyroid ala, from the elastic tissue of the submucosa (the pharyngeal aponeurosis), is which the palato-pharyngeus muscles (B, Fig. 5) end inferiorly. With these latter muscles the two little slips referred to (and which constitute a pair of pharyngo-œsophageal muscles) are at least in functional continuity; and their use is apparently to fix the circular fibres of the œsophagus posteriorly. Two somewhat similar but much smaller slips (E, Fig. 3, F, Fig. 5) are occasionally found passing downwards and backwards from the margin of the common tendon to the circular fibres. These two sets of slips are the only, and very slight, foundation which I can find for the third layer of muscular fibres, described by some authors, in the upper part of the gullet.

If we follow the highest circular fibres round to the side we will find that they do not meet in front. (I refer now to the very highest bundles of this layer for a distance of only about one-sixteenth of an inch from the termination of the layer.) Instead of meeting in front, when they reach the antero-lateral aspect of the tube, they run up along the outer margin of the longitudinal bands, now come to the front, and join the outer edge of their common tendon, through which they—as well as the longitudinal fibres—are attached to the top of the vertical ridge of the cricoid.

The fibres immediately beneath these just described meet in front, having previously crossed the posterior aspect of

the end of the longitudinal bands, and thus form complete rings (see above D, in Fig. 3).

Briefly, then, it may be said that the circular fibres of the œsophagus end as follow:—Posteriorly by becoming continuous with the corresponding fibres of the œsophageal portion of the inferior constrictor; on the lateral aspect the highest fibres form a small bundle, which is united on each side to the margin of the common tendon of the longitudinal fibres, and thus to the cricoid; whilst anteriorly, they grow gradually thinner, and finally cease a little below the level of the junction of the longitudinal bands with their common tendon (see Fig. 3).

A very good demonstration of the two bands of the longitudinal fibres, of their meeting above on the anterior aspect of the tube, and of their connection with the tendon which attaches them to the cricoid, can be obtained by dividing the œsophagus 4 or 5 inches below the cricoid, clearing its anterior surface, and separating it from the trachea and higher up from the cricoid, the latter operation being facilitated by cutting the lowest fibres of the constrictor on each side. On first making this dissection one is rather surprised perhaps to find that the œsophagus can be easily separated from the back of the cricoid almost as far as its superior border, displaying the posterior crico-arytenoid muscle fully, while leaving the œsophagus intact; and perhaps also at finding that the anterior wall of the tube is tendinous at its upper end, that is, opposite the back of the cricoid.

A more striking demonstration still is got by slitting up the posterior wall of the lower portion of the pharynx, and upper part of the œsophagus, pinning out the sides and removing the mucous membrane and submucosa with the greatest care from the anterior wall. The upper termination of the circular fibres, and the ending of the longitudinal fibres on the tendinous band running up to the top of the

cricoid as in Fig. 3 are shown in a very distinct and interesting way.

In most specimens it will be found that a few slips of the longitudinal fibres are attached to the back of the trachea, and higher up to the connective tissue over the lower end of the ridge of the cricoid.

Summary.

The longitudinal fibres of the œsophagus do not divide above into three bands—an anterior and two lateral—as usually described. At a point on the back of the tube about $1\frac{1}{4}$ inches below the cricoid the longitudinal fibres of each lateral half diverge from one another forming two "longitudinal bands" with a V-shaped interval between them. These two bands gradually wind upwards and forwards round the side of the œsophagus, pass up beneath the lower margin of the inferior constrictor (with which a few of the fibres may be connected by fibrous tissue) and coming to the front meet, but do not unite, and end somewhere below the middle of the cricoid, on a short common tendon about $\frac{1}{4}$ of an inch wide, which is attached above to the upper end of the vertical ridge on the back of the cricoid. In describing the longitudinal fibres it is preferable to trace them from the common tendon downwards, spreading dorsalwards and meeting $1\frac{1}{4}$ inches below the cricoid, &c. The V-shaped interval between the diverging bands is filled by the circular fibres of the œsophagus thinly covered over, below by irregular pinnately arranged or decussating fibres derived from the longitudinal layer, and above by the overlapping lower edge of the "œsophageal portion" of the inferior constrictor, with which the circular fibres blend.

The circular fibres end superiorly—at the back, by blending with the fibres of the œsophageal portion of the inferior constrictor; at the sides the highest bundle is prolonged forwards to the outer margin of the common tendon of the

longitudinal fibres; whilst in front they gradually thin off and finally cease a little distance below the middle of the cricoid.

The lower or "œsophageal" portion of the inferior constrictor differs from the rest of that muscle in that its fibres are continuous from side to side and do not decussate or join the raphe. It is apparently transitional between the circular fibres of the œsophagus and the inferior constrictor proper.

On carefully removing the mucous membrane, &c., from the back of the tube at its junction with the pharynx, there are generally found, running downwards and inwards on each side of the middle line, a few thin and scattered muscular bundles, constituting a pharyngo-œsophageal muscle, which arises above from the tissue in which the palato-pharyngeus ends, and terminates below by decussating with its fellow and joining the circular fibres near the upper end of the œsophagus, which fibres it helps to fix.

THE ARRANGEMENT OF THE MUSCULAR FIBRES OF THE STOMACH.

By A. BIRMINGHAM, M.D.;
Professor of Anatomy, Catholic University.

[Read in the Section of Anatomy and Physiology, June 3, 1898.]

A short time ago, when making a careful dissection of a stomach, in which the muscular fibres were particularly well developed, I was surprised to find that the arrangement of these fibres differed in several important details from the descriptions found in all our text-books, I believe without exception. My attention having been directed to the matter, I examined a number of stomachs, and, as each corroborated the evidence of the first, I have come to the conclusion that our current descriptions of the muscular coat of this organ are at variance with the facts that can be brought out by a careful dissection in any ordinary stomach, the muscular coat of which is fairly well developed, particularly if it has not been artificially thinned out by *post-mortem* over-distension for the purpose of facilitating dissection, or otherwise.

As an example of the text-book description, I shall give a summary of the account of the muscular coat found in the tenth edition of Quain's Anatomy, with which account, I may add, our other text-books practically agree.

Quain's description is as follows:—The muscular coat consists of three sets of fibres disposed in layers and named, from their direction, the longitudinal, the circular, and the oblique fibres.

The longitudinal fibres are continuous with those of the œsophagus. They spread out in a radiating manner from the cardiac orifice, and are found in greatest abundance

along the curvatures, especially the lesser one. On the anterior and posterior surfaces they are thinly scattered, or scarcely to be found, but are well marked and form a thick uniform layer near the pylorus.

The circular fibres form a complete layer over the whole extent of the stomach. "They commence by small and thinly scattered rings at the extremity of the great *cul-de-sac*, describe larger and larger circles as they surround the body of the stomach at right angles to its curved axis, and towards the pyloric end again form smaller rings, and at the same time become much thicker and stronger than at any other point. At the pylorus itself they are gathered into a thick bundle, which forms within a circular fold of mucous membrane—the pyloric sphincter. Some of the circular fibres appear to be continued from those of the œsophagus, spreading from its right side."

"The innermost muscular layer is incomplete and consists of the oblique fibres. These are continuous with the circular fibres of the gullet, at the left of the cardiac orifice, where they form a considerable stratum; from that place they descend obliquely on the anterior and posterior surfaces of the stomach, where they spread out from one another, and, taking the direction of the circular fibres, gradually disappear on the greater curvature."

Taking as the basis of my description the usual division of the muscular coat into three layers—an outer, a middle, and an internal—I have invariably found in stomachs, suitable for a proper dissection of this coat, the following arrangement, which is, I would submit, the true disposition of these layers.

The outer or layer of longitudinal fibres:—As regards these fibres I have little to say that does not agree with the usual accounts in our text-books. Its fibres are of course continuous with the longitudinal fibres of the œsophagus, and they form on each curvature, but particularly on the

lesser, a well-marked layer of numerous distinct bundles which thin off as the two surfaces are reached. The layer exists nevertheless over the greater part of these surfaces as a very thin sheet, the fibres being less distinctly longitudinal in places—particularly near the middle of the surfaces beneath the cardia—than in the neighbourhood of the curvatures (C, Fig. 1). The fibres from the right side of the œsophagus pass along the lesser curvature, whilst those from the left side can be traced over the summit of the fundus, and along the great curvature to the pylorus, some distance from which the fibres of the two curvatures, spreading out, meet and form a continuous and well-developed layer, of nearly equal thickness, all round the narrow end of the stomach. The fibres on the front and back of the œsophagus pass to the corresponding surfaces of the stomach, some arching towards the right, and others, which are more numerous, towards the left.

These latter, as they run downwards and to the left, become mixed to a greater extent than would appear on viewing the surface of the outer layer, with the underlying fibres of the next layer, which at this part of the stomach are passing in an almost similar direction (J, Fig. 1; N, Fig. 2), and which form, as will be explained below, the left limit of the middle layer, as they sweep from the right side of the œsophagus downwards and towards the left on the two surfaces of the stomach (N, Fig. 2). Between these œsophageal fibres, sweeping to right and left, there is an area on each surface some distance below the cardia, in which the fibres of this layer are irregular or wanting.

Fig. 1 gives a good idea of the general arrangement of this layer, but it should be pointed out that many of the fibres at J in Fig. 1, which appear to be continuous with the longitudinal fibres of the œsophagus, really belong to the middle layer, as can be shown by pulling off the longitudinal fibres as they descend from the œsophagus.

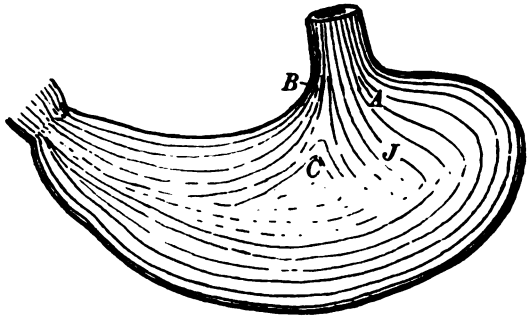

Fig. 1.

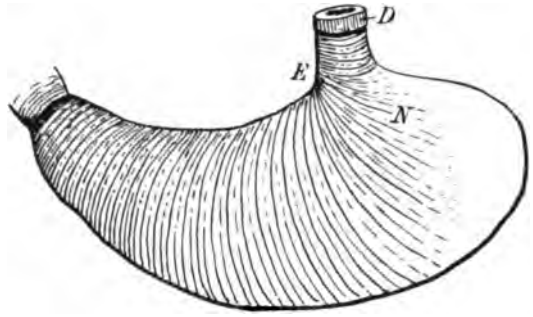

Fig. 2.

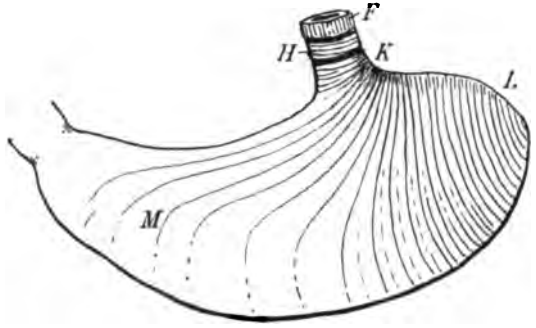

Fig. 3.

The middle layer;—The fibres of this layer are said—as shown in the quotation given above—to commence in the form of circles at the fundus, and to extend as a series of rings surrounding the stomach in its whole length, as far as the pylorus, where they are thickened to form the pyloric sphincter. With this I cannot agree. An obvious objection to such a description of the layer—apart from the fact that such an arrangement cannot be shown by dissection—is the difficulty or the impossibility of tracing the continuity between fibres so disposed and the circular fibres of the œsophagus—a difficulty which is got over in some descriptions by avoiding the question altogether, and simply stating that the fibres of the internal or oblique layer are continuous with the circular fibres of the œsophagus, while the circular fibres are allowed to commence on their own account at the fundus, no connection of any kind with the œsophagus being mentioned.

The current description, as quoted above, is practically correct in so far as it relates to the portion of the layer which lies to the right of the œsophagus. That part of it, however, which refers to the portion of the layer on the left of the œsophagus, is entirely inaccurate, for the very simple reasons that practically no fibres of the layer, at least no annular fibres, are found to the left of the cardia, and the fibres which form rings round the wide end of the stomach, commencing at the fundus, really belong to the internal or oblique and not to the circular layer of the muscular coat.

The arrangement of the fibres of this coat will be most easily understood if I begin their description at the pyloric end, and follow them towards the opposite extremity of the stomach.

At the pylorus, as usually described, the fibres are numerous and well-developed, constituting the pyloric sphincter, which surrounds this aperture in the form of a distinct and stout muscular ring. In the adjacent narrow portion of the

stomach the fibres are well developed, and the resulting rings are numerous and closely placed. As we pass on towards the left the layer becomes thinner and the rings correspondingly fewer, but they still form a distinct and well defined continuous layer, the fibres of which can be easily seen through the peritoneum, forming very symmetrical rings, disposed at right angles to the long axis of the organ. This regular arrangement is continued as far as the region of the œsophagus, where it is interrupted. Here the upper portion of the rings, as they cross the lesser curvature of the stomach, "hitch" against the termination of the œsophagus and are prevented as it were from passing any further to the left, whilst the lower portions of these fibres—namely, those on the surfaces—radiate from the right side of the cardia (where they are more or less heaped up against the œsophagus) downwards and towards the left, with varying degrees of obliquity, across the surfaces of the stomach. They finally end on these surfaces a little to the left of the line of the œsophagus, where they blend with the overlying longitudinal fibres, passing downwards and to the left from the front of the œsophagus (Fig. 2), and in part, turn down towards the greater curvature and join the underlying circular fibres of the internal layer—a termination similar to that of the oblique fibres of the internal layer. These fibres of the middle layer, which I have just described as radiating from the right side of the œsophageal orifice, pass by a gradual transition on the right side into the ordinary circular rings of the stomach, without any sudden change in their direction (Fig. 2); while tracing them onwards towards the left they will be found to become gradually more oblique, passing from the right edge of the cardia to higher and higher portions on the two surfaces, until finally, becoming horizontal (E. Fig. 2), they pass into the most superficial of the circular fibres of the œsophagus.

This arrangement can be reproduced diagrammatically

by taking a distended stomach with portion of the œsophagus attached, and passing on to it over its pyloric end a large number of elastic rings to represent the circular fibres. In the neighbourhood of the pylorus, and the adjacent parts of the stomach, the rings should be disposed in a continuous series at right angles to the long axis of the stomach until the œsophagus is reached. The next ring after this, having been passed over the pyloric end, should be drawn across the stomach until its upper end is caught by the œsophagus, its lower end should then be moved a little way towards the fundus, the succeeding ring having been carried as far as the œsophagus above, should have its lower end drawn still further to the left, and so on until finally a ring is put on which, when its upper end hitches against the œsophagus, has its lower end carried to the left, right over the fundus, so that it will come to lie as a band round the termination of the œsophagus (Fig. 2).

It should be added that, unlike the elastic bands in the arrangement just described, the fibres which radiate from the right side of the œsophagus, downwards and to the left, across the two surfaces of the stomach, do not form complete rings, but having blent to some extent with the overlying prolongations of the longitudinal fibres of the œsophagus on the front and back of the stomach (which are running in the same direction) they become lost on the surfaces and cannot be followed to the region of the great curvature.

The internal layer.—As I traced the circular fibres from the pylorus, I may, for convenience, trace these fibres from the fundus, for they are arranged on the portion of the stomach which lies to the left of the œsophagus, in practically the same manner as the circular fibres are arranged on the portion of the stomach to the right of the œsophagus. They begin, as circles, on the summit of the fundus (Fig. 3), whence, forming larger and larger circles, they pass to the

right in the form of rings encircling the wide end of the stomach, and disposed at right angles to the long axis of this part of the organ. When they reach the left side of the œsophagus, the upper ends of the rings "hitch" against it (an arrangement similar to that described on the opposite side of this tube in connection with the middle layer), whilst the rest of the rings radiate with increasing degrees of obliquity from the left side of the cardia, across the two surfaces, as the well-known and commonly described "oblique fibres" of the stomach (Fig. 3). Of these fibres those nearest to the fundus run with a very slight degree of obliquity, for the transition from the fibres which form rings round the wide end to the well-known oblique fibres is very gradual. The next fibres are more distinctly oblique, and are carried a considerable distance towards the pyloric end, whilst the succeeding and highest fibres run nearly parallel to, and no great distance from, the lesser curvature, reaching almost as far as the antrum pylori. Above this (K, Fig. 3) the oblique fibres are continuous with the deeper circular fibres of the œsophagus.

It should be pointed out here that the circular fibres at the termination of the œsophagus are divisible into a superficial set continuous with the fibres of the middle layer of the stomach, which radiate from the right side of the cardia, and a deep layer, which are similarly continuous with the oblique fibres of the internal layer. Not that these two sets of the circular fibres are distinctly separated from one another in the œsophagus, but it will be found, on removing the longitudinal fibres at the lower end of the tube, that the circular fibres lying immediately beneath, assume, as the stomach is approached, an oblique direction, the rings which these fibres form slipping down at the left side of the tube on to the stomach; below this they are seen to be continuous with the fibres of the middle layer of the muscular coat (E, Fig. 2). If these superficial circular

fibres, just described, be removed, it will be seen that there lies beneath them another set, the deeper circular fibres, which, becoming oblique, in the opposite direction, slip down along the right margin of the œsophagus as the stomach is approached, and pass into the oblique fibres of the internal layer of the stomach (K, Fig. 3).

It will be remarked that in both the middle and the internal layers circular and oblique fibres are found—the circular fibres surrounding all of the stomach to the right of the œsophagus in the middle layer, all to the left of the œsophagus in the internal layer; the oblique fibres of the middle layer radiate from the right margin of the cardia downwards and to the left, whilst in the internal layer they radiate from the left margin of the cardia downwards, and to the right, in each case, on both surfaces of the stomach.

The termination of the oblique fibres of the internal layer I found corresponds to the description given in our text-books. They all, so far as I can make out, after passing across the surfaces of the stomach obliquely for variable distances, turned rather abruptly towards the great curvature and joined the circular fibres of the middle layer (M, Fig. 3). As pointed out above at least some of the oblique fibres of the middle layer terminate in a corresponding fashion.

Summary.

The muscular coat of the stomach consists of three incomplete layers—external, middle, and internal.

1. *The external layer* consists as usually described of longitudinal fibres continuous with those of the œsophagus, best marked on the lesser curvature, when the stomach is distended, also well seen on the great curvature, and near the pylorus, but represented in practically all other parts by a thin layer, the fibres of which are irregular on the two surfaces some distance below the cardia.

2. *The middle layer* is composed of circular and oblique

fibres; the former, which are the more numerous, are found in the form of rings surrounding the stomach from the sphincter pylori, which they form, to the cardia. Beyond this the layer is continued for some distance in the form of oblique fibres which radiate from the right side of the œsophageal opening above, downwards and to the left on the two surfaces of the stomach. These fibres, becoming more and more oblique, are continued above into the superficial circular fibres of the lower end of the œsophagus. The fibres of this layer do not, as usually described, encircle the wide end of the stomach with a series of rings; these rings belong to the next layer.

3. *The internal layer* is composed, like the middle layer, of circular and oblique fibres, but, whilst the oblique fibres are but slightly developed in the middle layer, they form an important part of the internal layer. Beginning as a series of circles at the summit of the fundus, the layer extends in the form of a series of rings disposed at right angles to the axis of the stomach, as far as the cardia; beyond this it is continued by a number of fibres which radiate from the left side of the œsophageal opening downwards and to the right on both surfaces of the stomach, some of them reaching almost as far as the antrum pylori. These fibres end by turning abruptly towards the great curvature and passing into the circular fibres of the middle layer. The highest of these oblique fibres pass above into the deeper circular fibres of the œsophagus,

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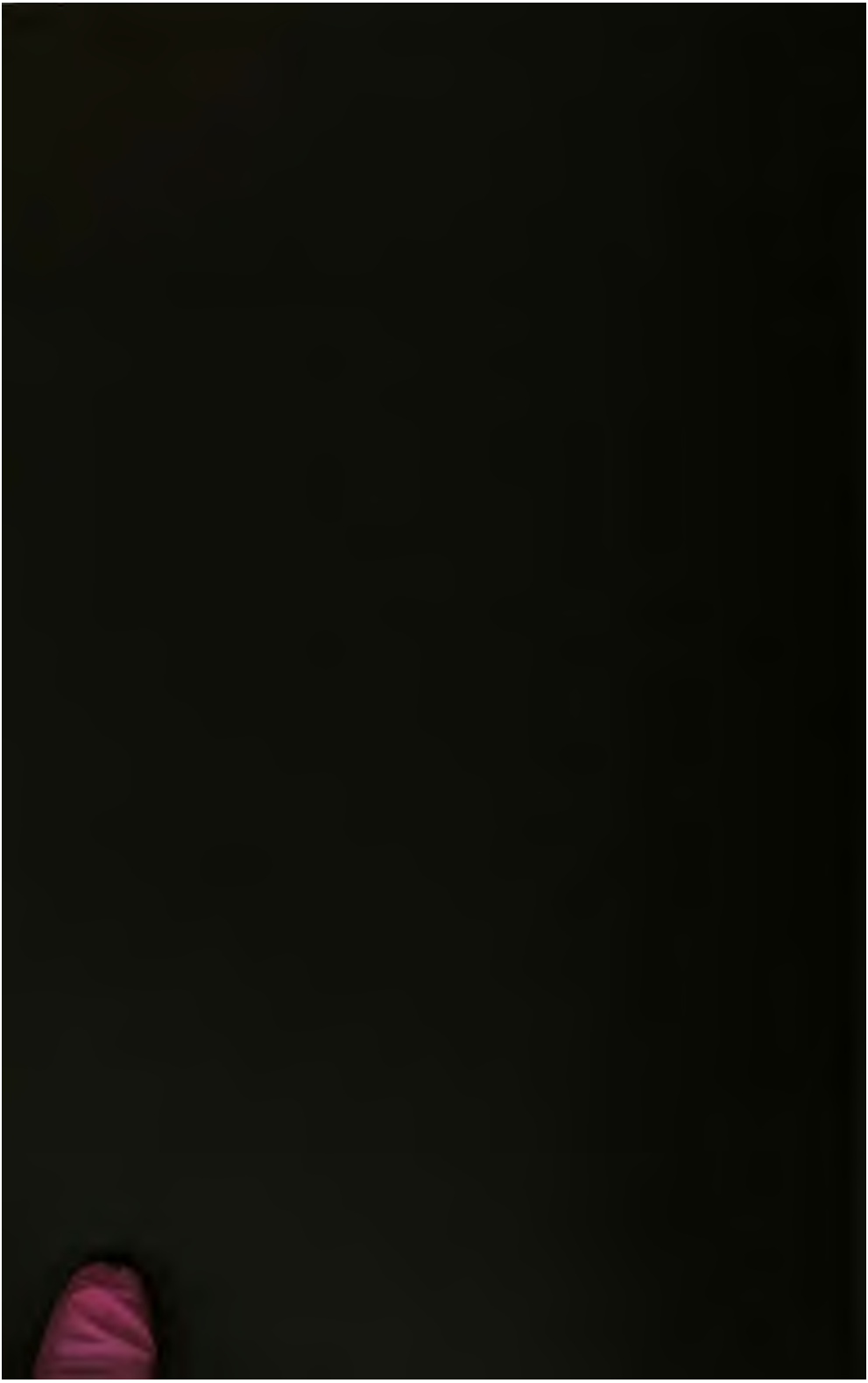

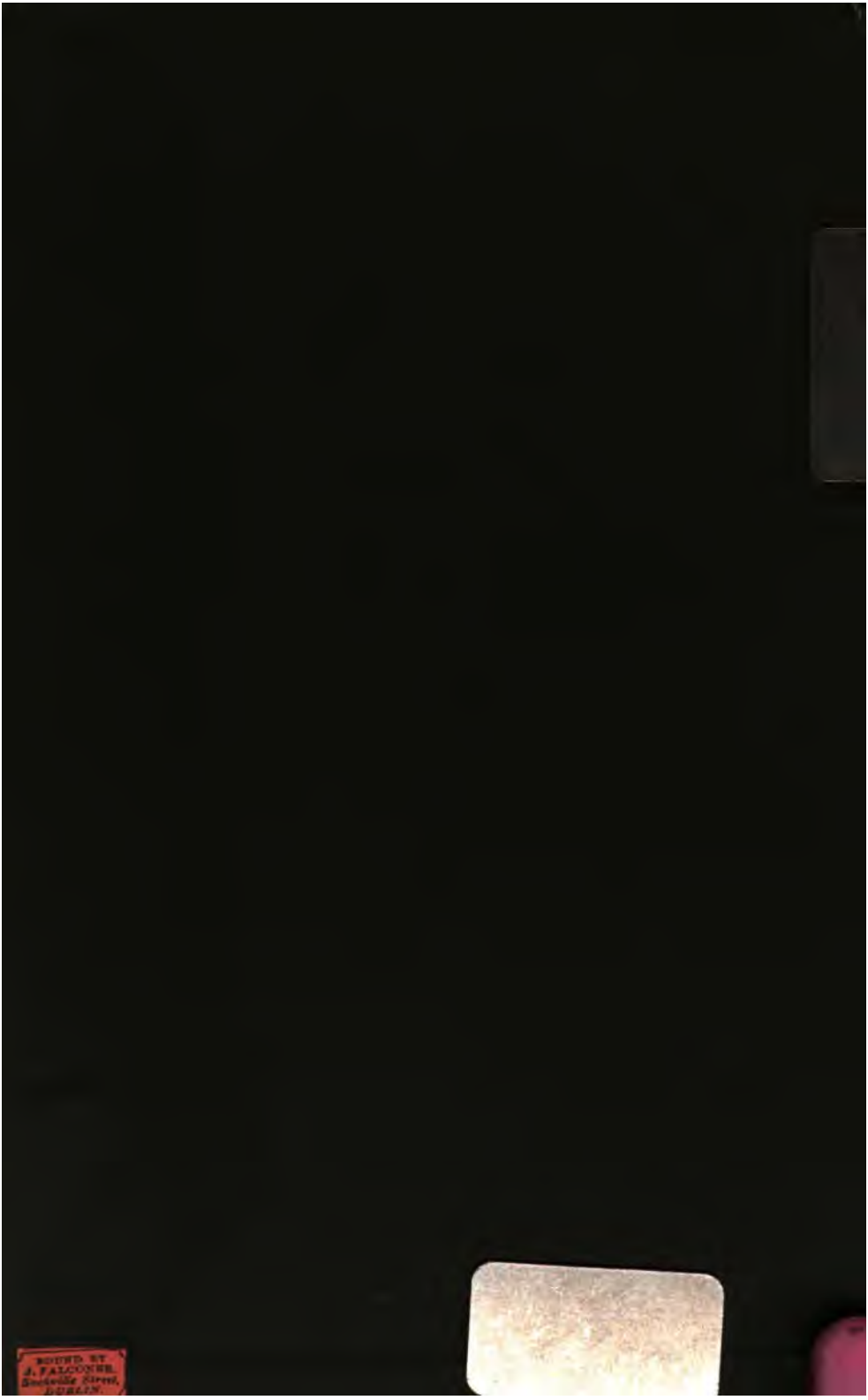
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